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FACILITIES

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BETHLEHEM STEEL

McClintic-Marshall Steel Construction

Volume 93 Number 26

STEEL

For forty-eight Years—IRON TRADE REVIEW

PRODUCTION • PROCESSING • DISTRIBUTION • USE

The Week in Perspective

CHRISTMAS this year finds the complexion of things altered measurably from the pallor of the last three years. Balance-sheet red is giving way to the rosy hue of a revitalized industrial outlook, and on many fronts there is cause for real rejoicing around the yule tree. Under pressure of a rush to specify fully against last-quarter contracts, the steelmaking rate of the country (p. 12) has jerked upward 5 points to 38 per cent, contrasted with 12 per cent a year ago. While first-quarter contracting has not yet developed in any volume, there is little disposition to become pessimistic over January, since the release of long-delayed automotive steel requirements is expected (p. 29) to fill in any voids which may develop in other lines.

Coil Springs Bring New Riding Comfort

Whisperings concerning details of new automobile models are gradually becoming amplified to an audible volume, and it appears the independent springing features of many lines will receive (p. 13) the most concerted ballyhoo. Compared with orthodox front-end mounting methods, the new systems, and there are several, are described as enormously complicated but providing unbelievably better riding qualities . . . . Despite previous threats of higher prices, two models, in the class line, have been reduced (p. 13) . . . . Chrysler's attempts to sell the merits of radical streamlining are being watched with interest . . . . Not in years have such a large number of cars (p. 14) at the forthcoming New York show been of the hand-made variety.

Life Is Just a Bowl of Alphabet Soup

After a couple of false starts by the PWA, CWA has stepped in forcefully and, backed by the RFC and the OK of the NEC, is furnishing a real stimulus to employment. FDR has ordered the PRA continued until May and has organized the EHFA to aid the TVA. He likewise continues (p. 15) a staunch defender of NRA's administrator, Gen. HSJ . . . . Discrimination in favor of union labor is seen (p. 18) in a recent order from the GHQ of CWA . . . . To add to the confusion, independent steel fabricators are becoming aroused over proposals to eliminate the FIT clause from freight rates. Structural shops are banding together to urge retention of the FIT clause. SOS!

100 Per Cent Gain in Steel Plant Employment

Shortage of skilled labor is already developing in the steel industry, according to a report (p. 12) of the Iron and Steel institute. Employment in October in the industry totaled 416,277, against 210,000 in October, 1932. . . . Attempts of the national labor board to chisel into employe elections at a large steel plant apparently having failed (p. 11), the situation is calmer, the company president indicating his preference for making steel over arguing with General Johnson in the newspapers. . . . To prevent harmful effect of chromium upon workmen engaged in chromium plating operations, strict cleanliness of work places, floors, apparatus and tools (p. 26) is an important feature. . . . More strike threats (p. 11) from the "captive" coal mines are reported in the wind.

Precision Grinding Provides Smooth Finishes

Ford, aiming at production (p. 14) of 4000 cars daily, has co-ordinated precision grinding operations for the production of forged steel camshafts of high accuracy. Rough, semifinish and finish grinding of the shafts is performed (p. 21) in rapid sequence following machining operations. . . . A British manufacturer has perfected (p. 26) a hydraulically operated machine for grinding one side of 20 gross of table knife blanks a day. . . . Correct drafting room practice and careful heat treatment are two factors of major importance (p. 23) in designing welded rolled steel structures for high efficiency of joints. . . . Cost saving of 32.2 per cent was effected (p. 27) by the use of rolled steel and welding in the construction of shoes for a 22-inch structural mill.

Threat to "F. I. T." Arouses Independent Fabricators

A THREAT to eliminate the "fabricated-in-transit" clause from iron and steel freight rates is seen in a recent move by the traffic committee of the American Iron and Steel institute.

Recently this committee addressed the Traffic Executive association and other traffic bodies, requesting that current tariffs providing "F.I.T." privileges on iron and steel be changed so as to require that freight bills and bills of lading covering the steel shipment to the transit point specify by appropriate clause the ultimate destination of the steel shipment after fabrication.

This contention is grounded on the alleged abuses of the "F.I.T." privileges under which bills of lading covering a particular steel job at a particular destination can be "switched," that is, applied against an entirely different job at another destination.

About a year ago the steel producing side of the industry undertook to correct this situation, and partly succeeded. Then, the plan adopted was to quote through the transit point on a basis of f.o.b. destination. This plan was aimed to put all fabricators on an equal basis for a particular job. This measure was in large part successful.

Code Attempts Solution

Later, when the steel code was adopted the following clause was included: "In the case of plates, shapes or bars intended for fabrication for an identified structure for the purpose of establishing the delivered price thereof, the place of delivery shall be deemed to be the freight station at or nearest the place at which the structure is to be erected, and not at the shop of the fabricator."

But the problem was not yet fully solved, because the steel consigned to a transit point is not definitely "earmarked". It is this "earmarking" of the steel that the traffic committee of the institute is asking.

Not without opposition, however. Independent steel fabricators consider this provision a threat to their very existence, because inherently they believe such a proposal would entirely abolish the fabricated-in-transit privilege that has caused most of them to locate in their present shop locations.

Recently, the Independent Steel Fabricators' Traffic association was formed at Pittsburgh and is now advising the steel fabricating trade of this proposed change. H. N. Holdren, traffic manager, Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, is chairman of the association.

The entire proposal comes up for public hearing at the Palmer house, Chicago, on Jan. 24 before the Traffic Executive association, Western Trunk Line committee, Central Freight association, General Freight committee, and other important freight bureaus.

The Independent Steel Fabricators' Traffic association now numbers over 100 interested members, leading among which are such representative structural shops over the country as Chicago Bridge & Iron Works, Chicago; Graver Tank & Mfg. Co., East Chicago, Ind.; Fort Pitt Bridge Works, Pittsburgh; Illinois Steel Bridge Co., Jacksonville, Ill.; Hammond Iron Works, Warren, Pa.; Independent Bridge Co., Pittsburgh; Petroleum Iron Works, Sharon, Pa.; Stupp Bros. Bridge & Iron Co., St. Louis; Ingalls Iron Works Co., Birmingham, Ala.; Lackawanna Steel Construction Corp., Buffalo; Biggs Boiler Works Co., Akron, O.; Truscon Steel Co., Youngstown, O.; H. H. Robertson Co., Pittsburgh; Pittsburgh-Des Moines Steel Co., Pittsburgh; Wheeling Structural Steel Co., Wheeling, W. Va.; and Wisconsin Bridge & Iron Co., Milwaukee.

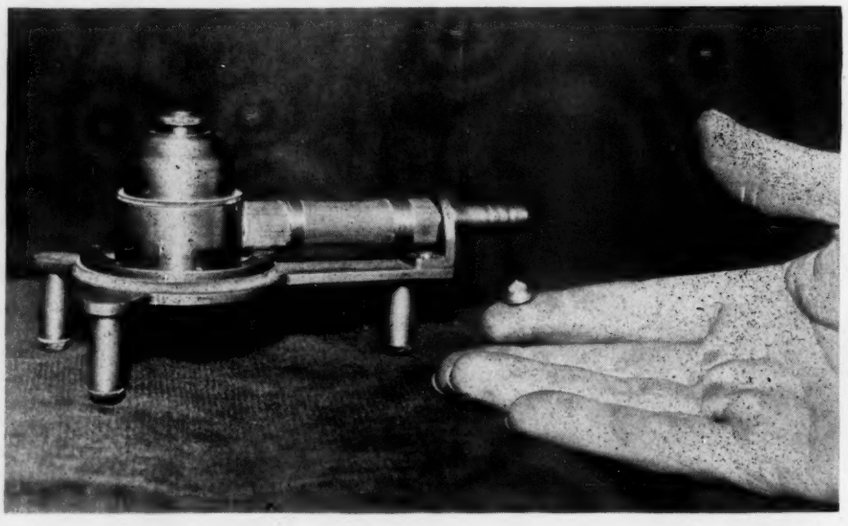
It has been this group's contention that to "earmark" steel for a specific job will be physically impossible in most cases because of the condition generally practiced among fabricators which finds the carrying of what is called "stock material." This material goes into the fabricators' yard and loses its identity. It is, therefore, impossible to earmark this steel at the time it is shipped from the rolling mill because it is obviously not known then just where it will be shipped.

This "earmarking" clause, it is further contended, would place a tremendous burden of bookkeeping and material handling on both the railroad and the fabricator; it would place the railroads in the position of policing and following up "earmarked" shipments; it would not solve the problem of delay in specific jobs beyond 12 months; it would not cover the situation of mixed car shipments for two of three specific jobs; nor would it solve the problem which arises when the job's destination is changed by the customer or the contractor, as is quite frequent in highway work.

See Competitive Handicap

Most of all, the independent fabricator feels that such an "earmarking" clause would most certainly mean a loss on a certain part of all of his shipments which would be entitled to transit privileges. Therefrom would come a freight loss to the fabricator and a greater handicap to him in competition.

From the adoption of such a clause, is can be foreseen that con-



Wide World Photo

WATCH THE MILLIONS CAREFULLY: This centrifuge motor, about the size of a teacup, is capable of rotating its tiny steel rotor—which is shown on the finger tip—at 1,200,000 *revolutions per minute, thereby developing a centrifugal force* 7,600,000 *times greater than the force of gravity. The motor was exhibited at the biennial exposition of chemical industries in New York recently*

ditions of more than a quarter of a century ago would return, when at that time fabricators were centered largely in the same cities as the rolling mills, or in large industrial centers, where building was active. Then, with no "F. I. T." clause, competition was not so keen as today and did not draw bidding on work from shops far removed from the scene. The "F. I. T." clause, which first was granted early in 1909, did more to change the picture in the structural fabricating industry than any other move in its history.

Preliminary Meeting Set

Before the meeting to be held in Chicago on Jan. 24, which will be public, a private meeting will be held at Pittsburgh, the week of Jan. 8 between a committee of the American Institute of Steel Construction and a joint committee of the commercial and traffic committees governing the administration of the steel code.

The independent fabricators consider the move to abolish their "F. I. T." clause on iron and steel unconstitutional in view of Section 3 to the Act to Regulate Commerce which makes such a move, if taken, obligatory on all competing commodities, also.

For example, steel tank fabricators believe that were such a proposal taken it would have to affect the lumber interests making wooden tanks. However, this latter point is not proposed by the request of the traffic committee of the institute to the carriers.

The attitude of the United States Steel Corp. and other steel producers toward this proposal is noncommittal. Generally speaking, steel producers are open-minded on the subject and are going through with the hearing to see what it will develop both on the uses and abuses of the much-harangued "F. I. T." clause in steel rate tariffs.

In addition to independent fabricators listed above as members of the Independent Steel Fabricators' Traffic association, the following associations have taken a sympathetic stand: Central Fabricators' association, Chicago; Chattanooga Manufacturers' association, Chattanooga; Society of Iron and Steel Fabricators, Milwaukee; Traffic Bureau of Nashville, Nashville; and the Oil and Gas Well Supply association, Columbus.

Labor

E. T. WEIR, chairman of the National Steel Corp., was as vigorous last week in combating certain claims of NRA Administrator Johnson as he was in resisting the attempt of the national labor board to chisel in on the Weirton Steel Co. election of employe representatitves for collective bargaining. Weirton is a subsidiary of National.

In language which General Johnson understands, Mr. Weir declared that the general's contention that he could not reach Mr. Weir until 6 p.m. on Dec. 14, the day prior to the election "is false."

Records of the telephone company show that General Johnson talked with Mr. Weir between 3:53 and 4:05 p.m., while a telegram from the general was received at 4:11 p.m., and a letter in response deposited in the mails at 5 o'clock. But General Johnson says Mr. Weir avoided him until 6 p.m.

"It seems to be part of General Johnson's policy to use vehement and bombastic language in the newspapers when attacking any manufacturer, and I do not intend to continue exchanging fire with him in the public prints," was Mr. Weir's parting shot.

Any further action concerning the Weirton election is strictly up to Washington. The department of justice was weighing the complaint of the national labor board that the company instead of the board had conducted the election, but no action had been taken up to last Friday.

Out of a total of 11,430 eligible voters, 9317 on 81½ per cent voted. The 98 employes elected Dec. 15 will represent all employes at the three Weirton plants.

On Saturday the Weirton company paid approximately $500,000 in wages and salaries to employes, the payment being made slightly in advance of the regular date to provide an extra pay before Christmas.

¶Front page accounts of labor difficulties at the Weirton Steel Co. had hardly died away last week before rumblings of a new strike in the steel-controlled "captive" coal mines of western Pennsylvania were heard.

Strike threats in the Fayette captive mine field center around the leadership of Martin Ryan, who aside from being recently discharged from H. C. Frick Coke Co.'s Colonial No. 4 mine, is head of an insurgent union in that troubled district.

Last week, a field representation of the national labor board met with Frick Coke company officials to discuss the growing tenseness of the situation. United Mine Workers' officials prevented an "outlaw" strike from being called on Dec. 19.

In the meantime, coal-mining subsidiaries of Jones & Laughlin Steel Corp., Pennsylvania fields are the scenes of conferences at which union officials and company officials are discussing the collective bargaining and union recognition demands of the United Mine Workers.

The next election of employe representatives for the Frick company

Wide World Photo

INTERNATIONALISM AND SPATS COMPLICATE WEIRTON ELECTION. William J. Long, head of the Weirton, W. Va., local of the Amalgamated Association of Iron, Steel and Tin Workers—the gentleman in checked suit and spats—is introducing Miss Susan Lawrence, former undersecretary of labor in the British government, at a meeting of union members of the Weirton Steel Co. prior to the election for representatives for collective bargaining, Dec. 15. Insisting that the election be held according to the rules agreed upon by the national labor board and E. T. Weir, chairman of the National Steel Corp., on Oct. 16, the company proceeded with the election and representatives of the employes' organization won in a vote which included a great majority of employes

fails in May, 1934, and their last election was May of this year.

¶Believed to be in anticipation of a test of the national labor board's authority in court, the President last week issued an executive order bestowing upon the board the authority he proposed for it when creating it in August.

The President in his order approved and ratified all past actions of the board and was explicit in saying that the authority of the board was (1) to settle by mediation, conciliation or arbitration all controversies, (2) to establish local or regional boards upon which employers and employes shall be equally represented, (3) to review the determinations of such local boards, and (4) to make rules and regulations governing its procedure.

Institute

AMERICAN IRON AND STEEL INSTITUTE last week announced numerous changes in the application of the iron and steel code.

To eliminate all agreements between producers of merchant wire products and jobbers of these items which were made according to the provisions of paragraph 3 of regulation No. 1 to the steel code, directors of the institute recently adopted the following resolution:

"Resolved that on and after January 1, 1934, Regulations No. 1 prescribed by the Board of Directors on August 29, 1933, and any and all agreements secured from jobbers pursuant to the provisions of paragraph 3 of such regulations, shall cease to apply to the following named products: Wire nails, wire staples, barbed wire, twisted barbless wire, merchant quality wire, wire fencing, wire bale ties and steel fence posts; provided, however, that this resolution shall not be deemed to terminate or affect the application of such regulations and of any such agreement to any other product or products referred to therein."

Commercial resolution No. 20, amended effective Dec. 18 and superseding commercial resolution No. 7, exempts Jefferson county, Alabama, so far as pig iron is concerned, from the arbitrary switching charges originally laid down in commercial resolution No. 7.

Commercial resolution No. 35, effective Dec. 21, permits certain deductions from base prices on less-carload quantities where purchaser takes delivery at a warehouse or railroad freight station.

Commercial resolution No. 36, effective Dec. 21, provides for filing of base prices on miscellaneous wire nails (not of standard sizes) telephone wire, armature binding wire and solid clothes-line wire.

Commercial resolution No. 37, effective Dec. 21, amplifies resolutions 8 and 18 in regard to ocean and rail-ocean freight rates shown in freight tariff No. 1.

Commercial resolution No. 38, effective Dec. 18, concerns the payment or allowance of freight charges on products sold to railroads for delivery on their lines.

Commercial resolution No. 39, effective Dec. 21, requires that agency agreements be filed with the secretary of the institute.

Commercial resolution No. 40, effective Dec. 21, permits deductions in base prices of hot-rolled strip to give effect to recent changes in extras in the light of the differentiation of hot strip from bars, bands, hoops, plates and sheets.

Commercial resolution No. 41, effective Dec. 14, provides for the filing of base prices on products not heretofore included in any base price list.

¶American Iron and Steel institute reports a shortage of skilled labor already developing in the industry, noting that in October 18.6 per cent of all emergency situations, where employes worked more than 48 hours and six days in one week, resulted from a lack of trained men. To achieve 70 per cent operations would require 125,000 additional employes.

Although production of iron and steel was off 9 per cent in October, employment declined only one-fourth of 1 per cent, and payrolls increased by nearly $800,000 to a total of $37,977,385. Employment in October was 416,277, against 417,020 in September, and 210,000 in October, 1932. In the last week of October, 84 per cent of all employes were working 40 hours a week or less. Average hourly earnings in October were 57.9 cents.

¶American Iron and Steel institute this week will pack up desks, chairs, file cabinets and other office equippage, leaving vacant the eighteenth floor of the Empire State building, New York, and occupying new and larger quarters on the thirty-third.

Production

SPURRED by specifications driven in by the Dec. 31 deadline on fourth quarter contracts, steelmaking operations last week advanced 5 points to 38 per cent, the highest rate since the week ended Oct. 14, and insuring a December average notably higher than November.

Early this week, production will suffer from holiday shutdowns, but not nearly so much as in former years, and the average will vary little.

Buffalo mills last week spurted 12½ points to 38 per cent, this week probably dropping to about 25. A close second was Chicago, which lifted 10½ points to 40 per cent, the best rate in two months.

With 19 out of 39 open hearths active in four plants, Wheeling mills expanded 10 points last week to 51 per cent. Nearby Pittsburgh mills operated at 29 per cent, a gain of 1 point. Since most open-hearth departments were scheduled to be down from Dec. 23 through Dec. 25, a recession of 2 to 3 points for this week is indicated. Fifteen out of 60 blast furnaces were operated last week in the Pittsburgh district.

Eastern Pennsylvania and Youngstown mills both rose 3 points, the former to 26 per cent and the latter to 39. A smaller percentage of loss is expected in the East this week, as a result of the holidays, than in any corresponding time in recent years. Youngstown mills were expected to open this week at 41 per cent or higher, with 35 out of 83 open hearths active and one more blast furnace to go in.

Cleveland mills would have remained unchanged at 59 per cent had not the National Tube Co. at Lorain closed its 10 open hearths Dec. 22, not to resume until Dec. 27. The Corrigan, McKinney Steel Co. operated nine for the full week and Otis Steel Co., five. The former company was down Dec. 24 and 25, but Otis worked through.

New England operations raised 1 point to 72 per cent last week and despite the holidays may hold the rate this week; in fact, one producer may go to 90 per cent. Birmingham and Detroit mills held steady at 52 per cent. At Detroit the Great Lakes Steel Corp. has heat on in its two new open hearths.

Financial

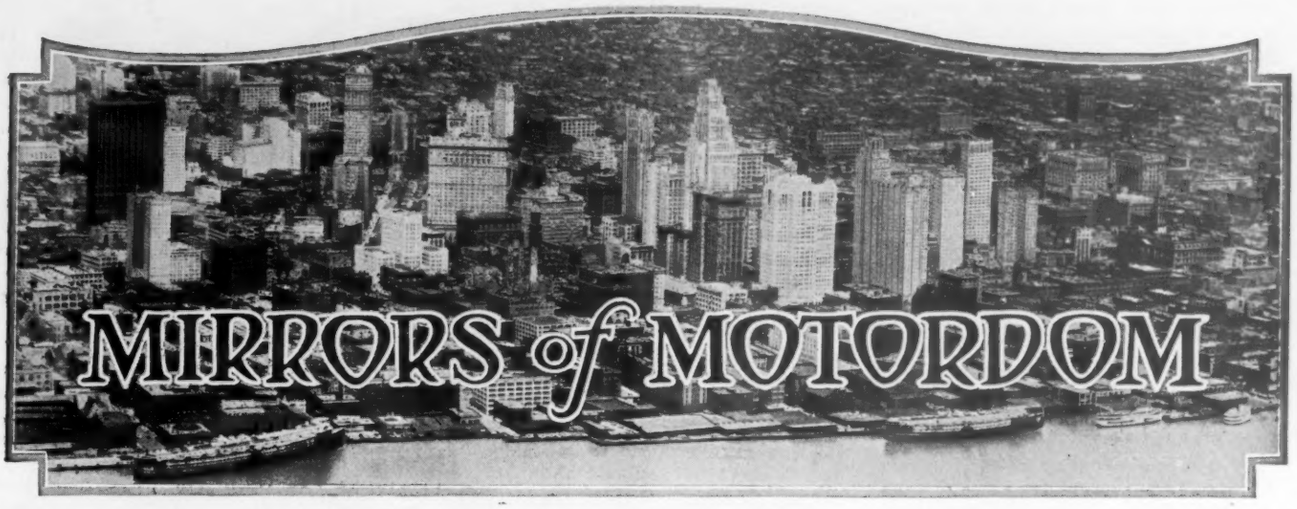
JOSEPH T. RYERSON & SON INC., Chicago, warehouse interest, has voted a dividend payment of 25 cents a share on the company's common stock payable Dec. 28 to record of Dec. 21.

This dividend, the first since 30 cents paid on Nov. 1, 1931, results from a noteworthy increase in sales, the volume for the last half of 1933 being estimated at 50 per cent greater than the same period of 1932. Edward L. Ryerson Jr., president, "looks forward to 1934 operations with reasonable optimism."

¶Acme Steel Co., Chicago, has declared an extra dividend of 12½ cents a share in addition to the regular quarterly payment of 25 cents.

Codes

PRESIDENT ROOSEVELT extended until Sept. 5, 1934, the automobile industry code which expires Dec. 31. This is the second major code to be renewed, that for iron and steel having last month been prolonged to May 31, 1934.



First View of Coil Springs

• • •

LaSalle Now in $1500 Class

• • •

Ford Goal Is 4000 a Day

DETROIT

BUICK, delayed a week in showing its new models and now scheduled to introduce them Wednesday, will lead the parade of "knee action" cars featuring coil springs, as differentiated from the type using an articulated axle, such as Hudson-Terraplane is adopting and which was described here last week.

In Buick, the front axle disappears entirely. A new front cross member extends slightly beyond the side rails of the frame, and under the outer ends of this member a coil spring is mounted. Below this new cross member is a wedge-shaped section somewhat resembling the platform to which Willys-Overland in a former series attached its front springs.

To each end of this section is attached drop forged braces, forming a V with the point attached to the bottom of the steering knuckle support arm. The bottom of the coil spring is attached to these two braces at the angle of the V. Within each spring is a telescoping cylinder acting as a shock absorber.

A V-brace also extends from the frame at the top of the spring to the top of the steering knuckle support arm, this forming in effect a parallelogram or, as called by some, a pantograph. Essentially, the independent mounting adopted by Plymouth is greatly similar to that of Buick.

Compared with the orthodox front-end mounting of semi-elliptic springs, the new systems are enormously complicated, the number of parts is greatly increased and many additional points to be lubricated are introduced.

However, as offsets, it is claimed that front springs no longer will perform any structural function but will now be free to cushion road shocks, and will be as soft as the rear semi-elliptic springs now are.

In most cars going to independent mounting of front wheels the coil springs will not revolve with the steering mechanism, but will work only in a vertical plane and will not be enclosed. Chevrolet is enclosing its springs in a strip steel case, incidentally encountering difficulties in welding the case, and its spring is a unit with the steering mechanism and will turn.

ITS new type of springs will receive major advertising emphasis by Buick.

Next will come a number of other mechanical changes, including a ride stabilizer, which is a spring steel bar in the form of a rocker arm, which serves as a cross member of the frame directly above the rear axle and is fastened at each end of the axle by connecting links. In many respects this is a parallelogram similar to that being used by Hudson-Terraplane in its new articulated front axle.

An entirely new steering system by Buick uses double tie rods linked at the center. Helical gears make all speeds, including reverse, silent. The gearshift lever moves in a much smaller radius.

An octane selector, first brought out by Chevrolet last year and permitting adjustment of carburetor to differing qualities of fuel, is controlled by a lever at the left side of the instrument board. The choke is now automatic. To start, it is necessary only to turn on the ignition and push down the accelerator pedal or the hand throttle.

Contrary to some reports, Buick retains its 90 series despite the fact that the new LaSalle straight eight will be priced at about $1500. The horsepower of the 50 series engine has been increased to 88, the 60 series to 100 and the 90 to 116.

Like most other General Motors cars, Buick for 1934 has adopted horizontal louvres of the type made popular by Olds in 1933. On Buick, there are four chrome trimmed permanently fixed louvres.

The radiator grille, a trifle more sloping and pointed, has a colored center strip from top to bottom. Trumpet horns are mounted under headlamps. A beading of stainless steel along the running board extends to the inner edge of the rear fender and to the point of the valance in front, accentuating the length of the car.

COUNT it one of the upsets of 1934 that Cadillac has been reduced to a base of $2395 and LaSalle to $1495 despite the forecast of Alfred P. Sloan Jr. that prices of General Motors cars would be advanced.

In 1933 Cadillac began at $2695 and LaSalle at $2245. Cadillac thus becomes more competitive with the lower price Packards and Lincolns, while LaSalle wedges into a market where Buick has boasted of supremacy for years.

When W. S. Knudsen several months ago was given charge of all General Motors automobile manufacturing operations it was said in STEEL that Detroit henceforth would figure more in the corporation's counsels and that the Fisher brothers, actively in charge of Cadillac-LaSalle and Fisher body, were backing Mr. Knudsen.

The new prices may be an indication that the Fishers are determined to win some volume for their cars and that General Motors lines will again become competitive. This is also borne out by the introduction of the Olds six between Chevrolet and Pontiac. The report of a low price Buick, possibly in spring if the

retail market looms large, receives some substantiation from this invasion of LaSalle into the middle of the Buick field.

LaSalle, as predicted, is a straight eight this year, thus easing the problem of dealers who are selling the Olds straight eight not priced far below LaSalle's new levels. Cadillac retains the three lines—eight, twelve and sixteen.

Cadillac front fenders come to a point in front of the wheel, then taper to a roll at the bottom of the radiator grille. LaSalle front fenders hook around the front wheel, for all practical purposes following the wheel around a point level with the hub cap. The Cadillac radiator grille is of the mesh type, like LaSalle's but the V is sharper and the slope greater.

Both cars have lacquered bullet type headlamps, but Cadillac has small bullet shape parking lamps mounted directly under the main set. The bumpers on both are double flat sections, at a distance giving the impression of the wings of a biplane.

Cadillac hood louvres are horizontal, but LaSalle has five circular ones. Running boards of both have a chrome beading which extends into the valance of the front fender, heightening the impression of length. Front fenders of both are squared off where they join the running board.

Except of course on a larger scale, the rear of both Cadillac and LaSalle have about the same rake as this year's Willys, and also have the spare tire recessed into the rear. Colored disk wheels, with large hub caps, are standard equipment.

Pierce-Arrow's new eight and twelve are not greatly changed in appearance from 1933, but parking lamps are mounted between the radiator shell and the main headlamps, which are drawn out of the front fender in true Pierce-Arrow style.

CONTINENTAL, the subject of much gossip, appears finally to have formulated its program for 1934 It will concentrate on the small 4-cylinder Beacon model, which in 1933 had a 101½-inch wheelbase.

Transverse springs, a type heretofore used only by Ford, have been adopted for the front, with long wishbone radius rods, and one shock absorber mounted in the center of the I-beam axle. Hood louvres will be of the horizontal type. There will be four lines—a two and a four-door sedan, a deluxe four-door sedan and a standard coupe.

For the past year, rumors of a small Hupp have been current. Murray recently designed a body which has pleased Hupp engineers, and the prospects of a small six, priced to be competitive with Dodge six and Pontiac eight or slightly above that range, are considered to be good.

This new Hupp will not be brought out before spring. Meanwhile, at the New York show Hupp will introduce a revised six and a medium-price eight, the latter somewhere between the price ranges of the two 1933 series of eights. Next to Chrysler and DeSoto, Hupp will probably have the most radical body at the the New York show.

Hudson-Terraplane, however, will not be far behind the Chrysler group. As previously noted, there will be a standard Terraplane six on a 112-inch wheelbase, a deluxe model on a 116-inch wheelbase, and Hudson eights in 116 and 123-inch lengths.

The special articulated front axle providing independent mounting of front wheels, the luggage vestibule in the rear concealing the spare tire, the automatic choke, the high-chrome alloy cylinder block and the optional cylinder head, giving a compression of 7 to 1, are only a few of the changes.

The Terraplane six engine has been increased to 3 x 5 inches, once the diameter of the famous Hudson supersix engine, and the displacement has been increased from 193 to 212 inches.

With the standard head giving a compression ratio of 5.75 to 1, the Terraplane six engine develops 80 horsepower. The deluxe series, on a four-inch longer wheelbase, has a composite aluminum and iron head which gives a compression ratio of 6.25 to 1 and raises the horsepower to 85.

The two Hudson eights are 3 x 4½ inches, the standard series having a compression ratio of 5.75 to 1 and 108 horsepower, and the deluxe with a composite aluminum and iron head, a ratio of 6.25 to 1 and 113 horsepower.

Eight integral counterweights on the crankshaft are claimed to remove all vibration from the Terraplane six. Adjustable stabilizing arms insulate the chassis from the transmission.

Hudsons and Terraplanes have dropped the water temperature indicator on the instrument board for a water level indicator, a cork float in the top of the radiator actuating an electric device registering on the instrument panel. More cork inserts in the clutch are said to insure softer engagement. Telescoping cylinders, called road levelers, supplant previous shock absorbers.

The new Terraplane radiator shell has chrome plated fins radiating from the bottom center in a sunburst effect. The Hudson grille, with a sharper V, gives a honeycomb effect of the type used in the Oldsmobile six this year and in the new Buick eights for 1934.

New tire sizes are 16 x 6.25 for all Hudsons, 16 x 6.00 for Terraplane deluxe six and 17. x 5.50 for Terraplane standard six. Hudson is consolidating its parts and accessories merchandising activities in a field service development department, headed by T. H. Stambaugh, formerly with General Motors.

COIL springs may make riding softer for buyers of new cars in 1934, but at the moment they are making the changeover in plant facilities for new models the hardest in years.

In addition to fabricating the new springs, automobile manufacturers have extraordinary adjustments to make in the revised front cross members of the frame and modifications in braking and steering mechanisms.

Test models made by hand are one thing; to attain quantity production so there is an uninterrupted flow of parts to the final assembly line is another.

One maker has discarded so many new springs that a sizeable scrap deal is pending. So far as steel consumption in the aggregate is concerned, the total weight of the new springs and mechanism varies little from the semi-elliptic type, and there is a noteworthy increase in the number of individual parts, especially forgings.

Some manufacturers have not yet even completed their pilot cars—the first hundred or so to roll off the line in regular assembly, in effect a dress rehearsal. Not in years will so large a proportion of models at the New York show be hand made.

Ford is in the best position of any large producer, last week approximating 1500 units a day, on a 5-day schedule, and aiming at 4000 daily as rapidly as possible. The tentative January schedule is 70,000.

Buick is in full production and is aiming at about 7500 in January. Cadillac made its first new model last week. Plymouth and Dodge, being little changed, are ready to swing into volume production.

Steel releases have been disappointingly light, because of the delay in getting into production. If December assemblies exceed 100,000, it will be surprising. January will probably double this figure and February and March now loom as heavy production months.

November Steel Imports Off

Preliminary report on foreign trade for November shows iron and steel imports at 28,979 tons, a reduction of 38 per cent from the 46,673 tons of October, and the lowest for any month since May. In 11 months, imports have totaled 383,480 tons, compared with 349,024 tons a year ago. A complete report on November, including exports, will be printed next week.

WINDOWS OF WASHINGTON

WASHINGTON

IRON and steel executives never did like the federal trade commission, and they shortly may have further cause for grievance.

Animosity began 14 years ago when the commission, let down at the end of the war with only minor responsibilities, set out to compel producers of iron, steel, coal and coke to submit their cost data each month. When producers took the matter to court the commission won on points, but by such a narrow margin it called it quits.

Then the commission stirred up the industry in the Pittsburgh basing point case, patently became an advocate of consumers as against the mills, and ultimately instituted the present multiple basing system.

Recently, in furtherance of the wish of the senate, the commission requested all corporations of any magnitude to submit the amount of salary paid to all executives. The result is that the commission now has the most complete information ever assembled in one place on steel salaries.

From time to time the administration has put the thumbscrew on salaries. RFC loans to the railroads have been predicated upon reductions. At some recent code hearings it was suggested that $15,000 be the maximum for presidents of companies in what might be called the fabricating strata of the industry.

There is no suggestion thus far whether the payrolls of iron and steel producers are out of step with the times, or rather the administration's views. Nor is there any indication that these payrolls will be made public.

But it is better than an even chance that somehow, when the information is transmitted to the senate, it will leak out, and what a field day for newspapers in printing it!

There is this much to be said for steel: Compared with life insurance and railroad salaries—the latter prior to RFC deflation—and those of some other industries, the steel stipends seem meager.

Steel Salaries To Be Aired?

• • •

Stainless for Air Flivvers

• • •

No Soviet Steel Orders, Yet

NUMBERLESS families taking off each Friday afternoon in their flivver airplanes for a transcontinental hop or some other weekend joyride—such is the dream of the department of commerce, which stainless steel may help make come true.

Taking the position that the development of private flying is being retarded through lack of a low price, easily maintained plane, Eugene L. Vidal, director of aeronautics of the department, is proposing the manufacture of a plane that will come within the reach of the man who now spends $700 to $800 for his automobile.

The plane in mind is a small, low wing monoplane, selling for about $700, which would carry two passengers. It would be stainless steel—the fact that it can now be welded makes this material first choice—powered with a small bore 8-cylinder engine turning over at 4000 r. p. m. driving a geared propeller.

The outstanding feature would be a landing speed of only 25 miles per hour, made possible by "air brakes" in the form of wing flaps, but this would hold down top speed to 100 miles.

The possibilities ramify in every direction: Further development of airports and landing fields, flying clubs, aerial service stations and repair bases, all potential consumers of steel for construction and maintenance.

In response to questionnaires, 12,700 favorable and 4900 unfavorable responses have been received, these being calculated to afford a gage of the market. The favorable replies indicate a market for 55,000 units. At present, 10,000 orders a year would tax plane-making capacity.

Century Ago They Struck For a 10-Hour Day

SCANNING the history of the labor movement in the past 100 years, the bureau of labor statistics, department of labor, finds:

Skilled workers a century ago were paid $6.75 to $10.50 per week with hours from "sunrise to sunset."

When carpenters in Boston in 1832 struck for a 10-hour day, master builders broke it by offering $2 a day, which was an advance of 50 cents a day.

The first laborers coming to the United States were indentured servants, with practically the same status as slaves and could not marry without their masters' approval.

First labor union meetings were called by cabalistic symbols written on sidewalks and shop walls and held in secret.

THE President continues a staunch defender of NRA Administrator Johnson, saying that the new national emergency council which is to co-ordinate all anti-depression activities will not put a bridle on the general. The council, enlarged to include the attorney general and several others, takes hold Jan. 16 . . . . Russia continues disappointing from the standpoint of business. Nothing is heard now of huge tonnages of rails to be rolled in early 1934, although it is premature to dismiss the hope entirely. Consuler officers probably will enter Russia, after Ambassador Bullitt, before the trade commissioners or commercial attaches of the department of commerce . . . . Less talk is heard of the possibility of war between Russia and Japan, which recently was looked to as the source for large airplane orders.

Died:

ARCHIBALD ALSTON STEVENson, 71, for 41 years associated with the Standard Steel Works, Burnham, Pa., until his retirement in 1929, in Ardmore, Pa., Dec. 15, after an illness of several months.

From 1881 to 1886 he was draftsman at the Southwark Foundry & Machine Co., Philadelphia, and later became affiliated with the Cambria Iron & Steel Co., Johnstown, Pa., where he designed furnaces and equipment for commercial heat treatment of axles and other forgings. Entering the employ of the Standard company in 1888, he rose through various positions to become vice president.

During the World war he was chairman of the Gun-Howitzer Production club, organized to speed the manufacture of gun forgings. He was past president and honorary member of the American Society for Testing Materials and a member of other leading engineering societies. He was among the first to recognize the value of the microscope for metallurgical investigations.

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John Corwin Vance, 78, president, John C. Vance Iron & Steel Co., Chattanooga, Tenn., at his home on Lookout mountain, Dec. 17. Born in Urbana, O., he removed to Chattanooga at the age of 19 and became associated with his brother in the hardware business. In 1897 he formed a partnership with James B. Sharp to start an iron and steel warehouse business which, after a modest beginning, grew to be the largest in the South. Mr. Vance was organizer of the Dudley Bar Co., Birmingham, Ala., handling concrete reinforcing bars. He was also president of the Hermitage Portland Cement Co. of Chattanooga, and prominent in other industrial activities.

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Daniel Brown, at one time a foreman in the Edgar Thomson works of Carnegie Steel Co., Pittsburgh, in Pittsburgh, Dec. 17.

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Edward H. Darrow, 82, chairman of the board of the Buffalo & Susquehanna Railroad Corp. and of the Buffalo & Susquehanna Coal & Coke Co., in Buffalo, Dec. 18.

□ □ □

Robert H. Smith, 71, professor emeritus of mechanical engineering at Massachusetts Institute of Technology, Cambridge, Mass., at his home in Watertown, Mass., Dec. 11. He was the author of a number of textbooks dealing with principles of machine tool construction and operation.

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Donald J. Murray, 89, founder of the D. J. Murray Mfg. Co., Wausau, Wis., one of the oldest and largest general machinery and foundry operators in Wisconsin, Dec. 13. He had retired in 1921.

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Herbert Thacker Herr, 57, vice president, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., in Philadelphia, Dec. 19. He was the inventor of locomotive air brake equipment, and improvements in turbines, oil and gas engines.

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William J. Myers, 79, former president of the Union Stove Works, New York, in Brooklyn, Dec. 9. He had been connected with the Union Stove Works for 52 years until his retirement four years ago. He was former president of the National Association of Stove Manufacturers.

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Stanhope Boal, 77, president, Favorite Stove & Range Co., Piqua, O., in Piqua, Dec. 17. The company was the outgrowth of a charcoal iron business founded in Kentucky, by his father. For some years Mr. Boal was president of the National Association of Stove Manufacturers and of the Western Association of Gas Range Manufacturers.

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Arthur A. Brown, 60, assistant to the vice president, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., in Mount Vernon, N. Y., Dec. 19. A graduate in mechanical engineering, he was associated with the Bethlehem Steel Co in 1900, later joining the sales force of the Westinghouse Machine Co. at Pittsburgh. He was widely known among electric light and power officials.

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John J. Davis, 80, for many years identified with the iron and steel industry at Pittsburgh and Chicago, Dec. 13, at his home in Ft. Benning, near Columbus, Ga. He was born in England and on coming to the United States in 1875 worked for Pittsburgh mills. Later he became superintendent of the Interstate Iron & Steel Co., East Chicago, Ind., now part of the Republic Steel Corp., and held this position until his retirement ten years ago.

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Benjamin Emerman, 79, organizer of the first chain scrap iron business in this country, in Erie, Pa., Dec. 14. An immigrant from Koenigsburg, Germany, he organized the Cleveland, Akron & Canton Iron & Metal Co. in Akron, O., in 1885. Fifteen years later he moved to Erie, where he formed the Erie Iron & Metal Co. Subsequently interested in real estate promotion, in February of this year he organized the Erie Scrap Iron Co., Erie, of which he was president.

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John Franklin Stevens, 63, consulting engineer, inventor and manufacturer of electrical instruments, in Philadelphia, recently, following a long illness. Graduated from the University of Pennsylvania in 1891, he became affiliated with his father's company, John S. Stevens & Sons, later the Steward & Stevens Iron Works, remaining until 1913. He was a former president of the Engineers club of Philadelphia and a former vice president of the American Institute of Electrical Engineers.

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R. A. Pendergrass, 57, resident vice president, McClintic-Marshall Corp., New York, at his home, Hastings-on-Hudson, N. Y., Dec. 21. Born in Troy, N. Y., he was graduated in civil engineering from Cornell university with a master's degree. Except for a brief period with American Bridge Co., his business career was spent with McClintic-Marshall. During the war he was in charge of fabricated ship operations of the company for the Emergency Fleet corporation.

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George E. Tebbetts, 56, recently engineer of structures for the Chicago Rapid Transit Co. and an authority on bridge and reinforced concrete structure design, in Chicago, Dec. 13. At one time he was identified with the United Gas Improvement Co., Philadelphia; later was bridge engineer of the Kansas City terminal, and during the war was with the Emergency Fleet corporation at Philadelphia. He joined the Chicago Rapid Transit Co. in 1925, after serving for several years previously as bridge engineer of the Chesapeake & Ohio railroad.

Cincinnati Milling Machine Forms British Subsidiary

Fred A. Geier, president of the Cincinnati Milling Machine Co., at Oakley, O., issued an important announcement December 14.

The company has concluded arrangements for the building of certain types of milling machines in Great Britain. Machine units and parts will be supplied from Cincinnati and incorporated in the finished machines built by Cincinnati Milling Machines **Ltd.**

Formation of this new company was announced in London, Dec. 12, by J. B. S. Gabriel, chairman of the board. Mr. Gabriel stated that a modern factory would be established in Birmingham, providing close contact with the principal motor car manufacturers and other production industries.

The distribution of both the Cincinnati built and British built machines will be handled by Charles Churchill & Co. Ltd., which introduced Cincinnati millers to British industry many years ago. The Cincinnati centerless grinder is another development of the company now being manufactured in Great Britain.

Industrial Men in the Day's News

Addis E. McKinstry, President, International Harvester Co.

Born on a farm, he determined to make the manufacture of agricultural machinery his life work.

His first job was handling repair parts, from whence he rose to responsible sales positions.

By shifting to the manufacturing side of the business, he gained full understanding of the industry.

ADDIS E. McKINSTRY, who as noted in last week's issue of STEEL has been elected president of International Harvester Co., Chicago, succeeding the late Alexander Legge, is 63 years of age and was born on a farm near Eaton, O.

His schooling completed at the age of 16, he began work for the Deering Harvester Co., handling repair parts in the Mansfield, O., branch. Nine years later he was appointed general agent for the company, first at Helena, Mont., and later at Galesburg, Ill.

In 1902 the Deering company was merged with other farm equipment interests to form the International Harvester Co. At that time Mr. McKinstry was district manager of the Deering company for the eastern United States and Canada. A year later he was placed in charge of Canadian sales of the International company.

From sales work he transferred to the manufacturing end of the business, in 1907 becoming superintendent of the company's new plant at Hamilton, Ont. In 1912 he was appointed works manager of all plants in Canada and the eastern United States.

A year later Mr. McKinstry was called to the Chicago headquarters and placed in charge of designing agricultural machinery and improving old types. He also headed the purchasing and traffic departments.

He became vice president in charge of sales and collections in 1919, was elected a director of the company in 1925, and first vice president in 1932. In 1930 he was president of the National Association of Farm Equipment Manufacturers, now the Farm Equipment institute.

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Maj. R. A. Bull, consultant on steel castings, 541 Diversey Parkway, Chicago, has been engaged by the Ajax Electrothermic Corp., Trenton, N. J., to devote part of his time as its consultant and representative in the Middle West. He was director of the Electric Steel Founders, Research Group during the 13 years of its existence, and has had wide experience in steel founding, gained as a manufacturing executive with American Steel Foundries, Commonwealth Steel Co., Duquesne Steel Foundry Co. and others. He is past president of the American Foundrymen's association, which in 1927 awarded him the Joseph S. Seaman medal for his contributions to foundry practice. He is a member of numerous other technical societies.

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T. J. Litle Jr. has been retained as engineering counsel on electric cast iron for use in the automotive industry by the Detroit Electric Furnace Co., Detroit. He was formerly engineering executive at both the Lincoln and Marmon motor car companies, and is a past president of the Society of Automotive Engineers.

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Homer B. Johnson, former representative for the Pratt & Whitney Co., Hartford, Conn., in the Chicago district, has been appointed western divisional manager of the Sheffield Machine & Tool Co., Dayton, O., with offices as 549 West Washington boulevard, Chicago.

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George L. Bell, vice president, Caterpillar Tractor Co., San Leandro, Calif., has resigned, and will be succeeded by H. P. Mee.

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Harry W. McQuaid, nationally known authority on carburizing steels and case hardening methods, and collaborator in the development of the McQuaid-Ehn carburizing test, has joined the metallurgical staff of Republic Steel Corp., Youngstown, O. He will devote his time to research and development work.

Howard W. Burkett has been transferred from Youngstown to the post of metallurgical engineer of the corporation's Buffalo district.

Elmer Larned has been appointed metallurgical engineer in the Chicago district.

Harold T. Blair has joined the Republic organization as metallurgical engineer specializing in tin plate products; likewise Karl Kautz as

Harry W. McQuaid

ceramic engineer specializing in research and field service on enameling sheets.

M. J. R. Morris and E. R. Johnson will continue in their respective metallurgical capacities with the Central Alloy division.

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W. H. Warren, formerly, with Babcock & Wilcox Tube Co., Beaver Falls, Pa., has been appointed general manager of the Steubenville, O., plant of

(*Please turn to Page* 45)

EDITORIAL

Shilly-Shally Labor Policy Brings More Trouble

FROM the time the ambiguous Section 7a was written into the national recovery act, industry has been in a quandary as to the real intent of the government in relation to the old problem of labor representation. Frequently during the code writing period protests from employers to the effect that the government was discriminating in favor of labor unions were met by reassuring utterances from Washington that all workers were to be treated alike, that no employe was required to join a labor union to receive benefits under NRA, etc., etc.

Yet in spite of these placatory pronouncements, government officials have continued to show favoritism toward union labor and to make it more difficult for nonorganized workers or those participating in company employe representation plans to exercise their rights. The national labor board, under Senator Wagner, undoubtedly deserves credit for having settled many disputes of a difficult nature, but at the same time it has treated scores of open shop employers and employes unfairly. The same tendency to aid union labor and to harass all other classes of workers and their employers is noticeable in the activities of most of the administration's recovery agencies.

Preference to Union Labor Applicants for CWA Jobs Is Discrimination

Undoubtedly the most brazen case of unwarranted discrimination is the recent order from the headquarters of CWA, virtually stipulating that in offering relief work to the jobless preference be given to applicants holding union cards. The order is ambiguous—probably deliberately so—yet is phrased so that the majority of supervisors of local CWA activities will interpret it favorably to union labor. Moreover when questioned as to the intent of the order, Washington officials were quoted as declaring that the order means that union workers are to be given preference.

This interpretation cannot stand when reviewed by higher authorities unless the administration is ready to admit that it condones class discrimination. President Roosevelt's refusal to grant favors to war veterans was applauded by all thinking people. He reasoned that premature payment of the amounts due them many years hence would constitute unwarranted favoritism to a privileged class and would be discriminating in effect.

In the face of his commitment to this sound principle, how the President can sanction the present preferential treatment of union labor in CWA is beyond comprehension. Continuance of the present policy means that the tax payers of the country are being asked to foot the bill for relief work in which holders of union cards are given first chance at the jobs available. In other words, a union card is made the password by which a minority of eight or nine per cent of the workers of the country are given an advantage over the majority of 91 or 92 per cent.

Benefits of CWA May Be Jeopardized by Abuses in Its Administration

Incidentally, CWA should be checked up on the wages it is paying. Farmers, manufacturers and service companies are protesting that employed workers are leaving their regular jobs to take CWA work. A sufficient number of authenticated cases have been reported to prove beyond doubt the absurdity of the present scale of wages obtaining in CWA. The majority of industrial codes provide for a 40-hour week at a minimum wage of 40 cents an hour. CWA is paying 50 cents a hour. The good features of CWA should not be endangered by abuses in its administration.

However, the important factor in the situation is the cunning way in which the government, while professing to be fair in its treatment of the labor problem, utilizes every opportunity to discriminate. For months industry has viewed this tendency with uneasiness, but has been willing to give the administration the benefit of doubt. Many employers have been forced to spend hundreds of thousands of dollars to settle misunderstandings traceable directly to the ambiguous Section 7a and to the elusive interpretations of it by government authorities. In fact, in nine cases out of ten, no cause for labor difficulty existed before Section 7a came into the picture.

The administration probably justifies its shilly-shally policy on labor relations on the ground that it is designed to placate two opposing factions. The need for conciliation has been grossly exaggerated in Washington, and if the "clever" attempts to bolster union labor were dropped entirely, the labor "problem" could be solved to the satisfaction of every interested party and with comparatively little difficulty and delay.

THE INDUSTRIAL DIAL

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COUNTER-SEASONAL trends characterize business as the unusually eventful year of 1933 draws to a close. November witnessed the flattening out of the decline which set in in August, and December is providing the rare spectacle of a pre-holiday spurt in several important industries.

The rather sharp upturn in steelworks operations since the first of December practically assures a higher output for December than was recorded in November. The last time production in December exceeded that of the previous month was in 1927. The same thing happened in 1922, 1924 and 1925, although in the last named year November was ahead of December on the basis of daily average output. Counting 1933, December production has exceeded that of November in five out of the last 13 years.

Some hope that better days are in store for the machinery and equipment industries is offered by the recent improvement in orders for machine tools and foundry equipment. The monthly index of machine tool orders compiled by the National Machine Tool Builders' association has risen steadily from a low point of 13.4 in March to 82.8 in November. The index of foundry equipment orders compiled by the Foundry Equipment Manufacturers' association, down to 9.8 in March, climbed to 56.2 in August, relapsed to 23.2 in October and rallied to 36.6 in November.

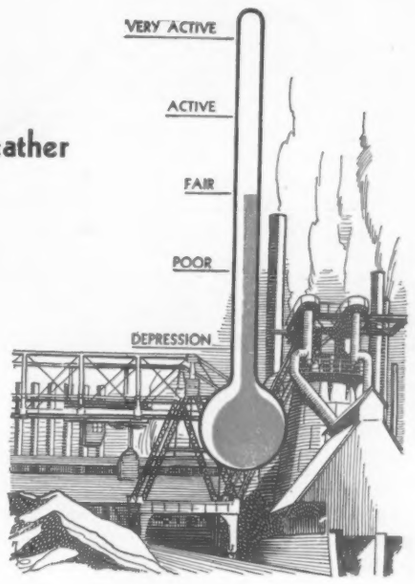
Inquiry and orders for machine tools are continuing in good volume into December, and builders view the outlook with more encouragement than has been evidenced in many months. In spite of the depressingly low volume of business in the first quarter, the average index of new orders for 11 months of 1933, at 46.1, is comfortably ahead of the average of 38.2 for the same period of 1932.

When the totals for 1933 are available, it is likely that five out of six product groups in industry will find that the volume of their business

Industrial Weather

TREND:

Upward



The Barometer of Business

Industrial Indicators

	Nov., 1933	Oct., 1933	Nov., 1932
Pig iron output (Daily average, tons)	36,627	43,699	20,858
Machine Tool Index	68.6	60.1	29.6
Finished steel shipments (tons)	430,358	572,897	275,594
Ingot output (Daily average, tons)	59,265	81,225	39,031
Dodge Bldg. awards in 37 states (sq. ft.)	.....	15,534,700	12,068,100
Automobile output	*60,000	142,157	61,760
Coal output, tons	30,435,000	29,656,000	30,632,000
Business failures, number	1,237	1,206	2,073
Business failures, liabilities	$25,353,376	$30,581,970	$53,621,128
Cement production, Bbls.	.....	5,037,000	6,462,000
Cotton consumption, bales	504,000	503,873	503,722
Car loadings (weekly average)	591,524	651,411	548,802

*Estimated.

Foreign Trade

	Nov., 1933	Oct., 1933	Nov., 1932
Exports	.....	$194,000,000	$139,382,000
Imports	.....	$151,000,000	$104,466,000
Gold exports	.....	$34,046,000	$16,000
Gold imports	.....	$1,696,000	$21,756

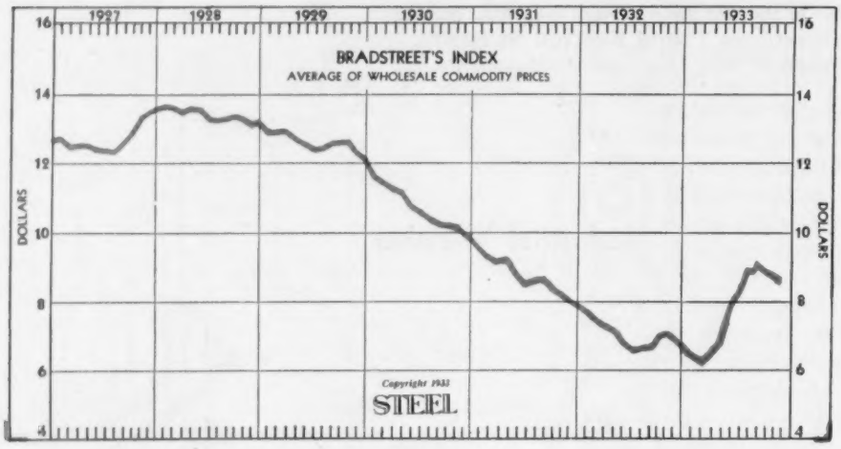
Financial Indicators

	Nov., 1933	Oct., 1933	Nov., 1932
25 Industrial stocks	$133.45	$127.86	$90.39
25 Rail stocks	$29.19	$31.23	$22.06
40 Bonds	$68.91	$72.77	$65.51
Bank clearings (000 omitted)	$17,305,124	$17,780,669	$17,828,196
Commercial paper rate N. Y. (per cent)	1½	1½	2
*Commercial loans (000 omitted)	$8,508,000	$8,593,000	$10,413,000
Federal Reserve ratio, per cent	65.1	65.5	62.6
**Railroad earnings	$57,264,780	$60,936,370	$62,784,037
Stock sales, N. Y. stock exchange	33,645,736	39,379,082	23,037,683
Bond sales, par value	$313,120,350	$232,922,600	$159,419,300

*Leading member banks Federal Reserve System.
**October, September and October, respectively.

Commodity Prices

	Nov., 1933	Oct., 1933	Nov., 1932	Monthly Av. 1913
STEEL's composite average of 14 iron and steel prices	$31.59	$31.59	$29.12	$26.32
Bradstreet's index	$8.81	$8.84	$6.97	$9.21
Wheat, cash (bushel)	$1.05	98c	63c	92c
Corn, cash (bushel)	61c	57c	43c	51c
Petroleum, crude (Bbl.)	.....	98c	90c	$2.50



	1933	1932
December 1	$8.81	$6.88
November 1	8.84	6.96
October 1	9.05	7.17
September 1	8.99	6.95

in the current year exceeded that of 1932. This is indicated by a comparison of figures for 11 months embracing the volume of about 50 typical divisions of industry. Of these, only eight have reported less volume in 1933 than in 1932, and some of these are very near the border line of parity.

The government monetary policy and the huge expenditures for recovery and relief are the principal factors which blur the more promising immediate outlook for business. They are the obstacles to the investment of private capital, which is one of the primary requisites of sound recovery.

Where Business Stands

Monthly Average, 1932—100

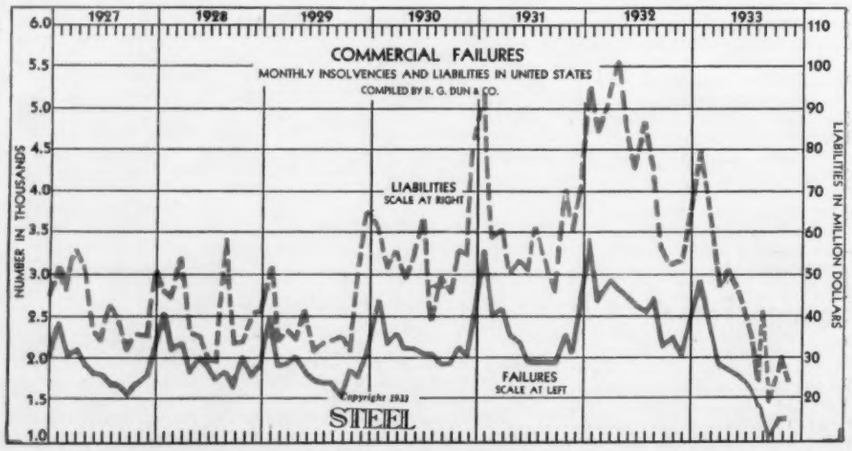
	Nov., 1933	Oct., 1933	Nov., 1932
Steel Ingot Output	141.2	193.5	92.9
Pig Iron Output	154.5	184.5	88.0
Freight Movement	108.9	119.9	101.0
Building Construction	.....	119.5	92.3
Automobile Output	50.2	119.1	51.8
Wholesale Prices	124.0	124.5	98.2

Commodity Price Index Continues To Drop, But Dip Is More Moderate

Bradstreet's index of wholesale commodity prices, embracing 96 representative commodities, stood at $8.81 on Dec. 1, as compared with $8.84 on Nov. 1 and $6.88 on Dec. 1 a year ago. Of the 13 groups of products, the sharpest gains were made in textiles and metals. Trivial gains were registered in four other groups, while losses were reported for seven groups, including breadstuffs, livestock and provisions. The loss of only 3 cents in November as against a decline of 21 cents in October indicates a flattening out of the present recession.

Except in Recent Months, Failures Now Are Fewest Since July, in 1923

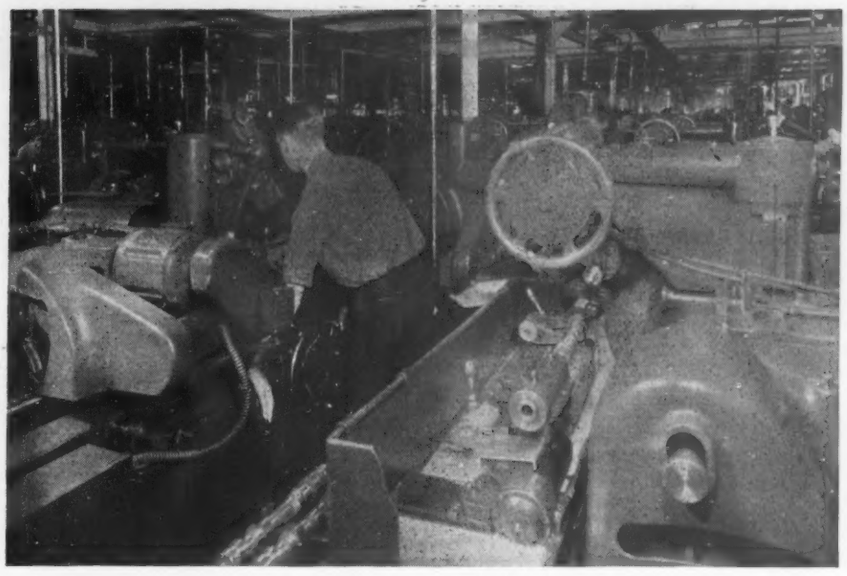
Commercial failures, reported by Dun & Bradstreet, Inc., numbered 1237 in November compared with 1206 in October. Liabilities were $25,353,376 as against $30,581,970 in the previous month. Omitting September and October of this year it is necessary to go back 10 years to July, 1923, to find a total of insolvencies below that of November. Excepting September of this year, liabilities in the eleventh month were the lowest since January, 1920.



Number	
November, 1933	1,237
October, 1933	1,206
November, 1932	2,073

Liabilities	
November, 1933	$25,353,376
October, 1933	30,581,970
November, 1933	53,621,127

BY EDWIN BREMER



CAM grinding machines placed close together permit one operator to attend two machines without any great fatigue. Shafts are conveyed to and from the machines on an overhead endless chain conveyor

CAMSHAFTS ARE FINISH GROUND TO CLOSE TOLERANCES

PRODUCTION of camshafts for automobiles manufactured by the Ford Motor Co., Dearborn, Mich., includes many machining operations, but final accuracy and finish are attained by precision grinding. Close check must be maintained in generating the various cam contours, since seemingly slight changes in contour will cause the valves to open or close improperly with consequent erratic engine operations.

Camshafts are of forged steel and for the 4-cylinder engines contain eight cams, while those for the 8-cylinder engines contain sixteen cams. In general both types of shafts are handled similarly, but where exceptions occur they will be pointed out. Only a few operations are conducted on the green or unhardened camshafts which are carried from machine to machine on an overhead conveyor system.

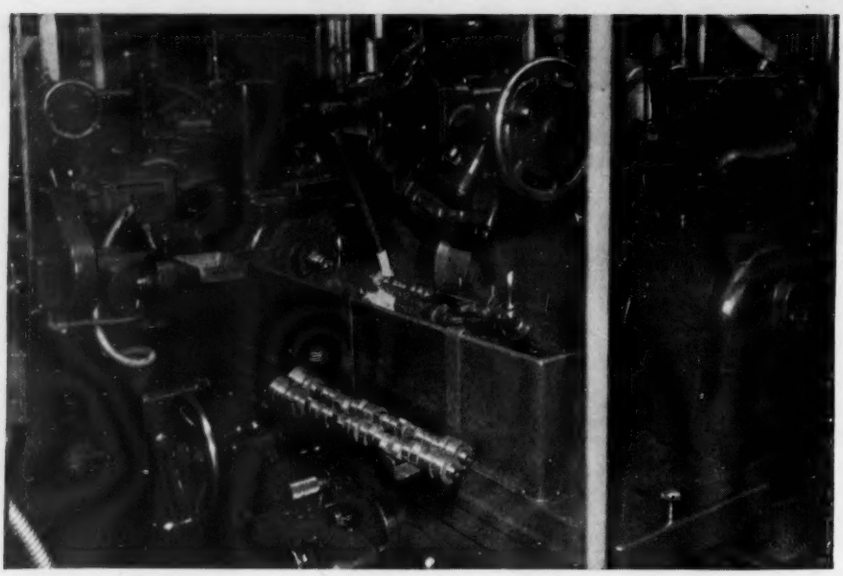
The first operation on the shaft is that of rough milling both ends, which is followed by drilling the center holes. The latter are drilled so that the correct length is obtained between centers as several following operations are located from the center hole. After the holes are drilled, the camshaft is straightened and the center bearing turned. Then the shafts are conveyed to a machine on which the sides of the cams are faced, diameters between cams turned, oil grooves cut, and the inside of the flange faced.

Next the ends of the shafts and the gear post are rough turned in one machine, and the front and rear bearings rough turned in another. The flange is faced and the diameter of the flange is turned. Following those operations a slot is milled on the face of the flange for locating other operations. A special machine then mills the contours of eight cams at one time on the shaft for the 4-cylinder engine.

Shafts for 8-cylinder engines are milled on two similar machines. As the various machining operations described are severe in character, the camshaft now is straightened and the ends are spot-faced.

After spot-facing the camshaft is conveyed to a centerless grinder where the bearings are rough ground to a tolerance of 0.001-inch, at the rate of 100 per hour. The 8-cylinder shaft bearings are ground on machines containing three grinding wheels 24 inches in diameter with 1¾, 1½ and 1⅞-inch faces which grind the three bearings simultaneously. Camshafts for the 4-cylinder engines are ground on a similar type machine containing four wheels on one spindle which grinds the three bearings and the end of the camshaft flange simultaneously.

The camshafts are recentered and at that point a slight variation in handling procedure is made between the 8-cylinder and the 4-cylinder shafts. The eccentric on the 8-cylinder camshaft is turned and the oil grooves cut. With the 4-cylinder camshaft, the gear on the center of the shaft is cut and then the oil grooves machined. Following those operations the shafts are heat treated in rotary electric furnaces, quenched in a caustic soda bath and then in hot



Contour grinding of the cams is performed on a hydraulically operated machine which grinds one cam and then automatically indexes to the next

water to obtain a minimum Rockwell hardness figure of 53 on the C scale. The hardness usually ranges from 53 up to 58. After heat treatment the shafts are restraightened for following operations.

After the restraightening operation, the three main bearings on both the 4 and 8-cylinder camshafts are semifinish ground simultaneously on a hydraulic grinding machine with three wheels mounted on one spindle. The wheels are 36 inches in diameter with a 1¾-inch face for the front bearing, 1½-inch face for the center bearing and 1⅞-inch face for the rear bearing.

Following the grinding of the bearings there is a slight difference in handling the two types of camshafts. For clarity, the methods used in handling the 4 and 8-cylinder camshafts will be described separately beginning with the 4-cylinder shafts.

Three Grinding Operations

The cams are rough ground on a regular cam grinding machine at the rate of 20 per hour. Then two dowel holes are drilled in the flange. The camshaft is recentered so that the flanged end is true with the dowel holes.

The shaft then is placed in a three-wheel hydraulic grinder and the three main bearings are finish ground to within 0.001-inch. The gear post is turned to within 0.001-inch and the dowel holes are sized to within 0.0005-inch. The center gear then is ground to about 0.004-inch less in diameter than the center bearing.

Semifinish grinding the cams on the 4-cylinder camshafts is performed on regular camshaft grinding machines or on automatic machines. Grinding is held to within 0.002-inch, and 18 shafts per hour are ground on the regular camshaft grinding machine. The cams are finish ground on automatic cam grinding machines at the rate of 8 or 9 per hour. The wheel used is 24 inches in diameter with a ¾-inch face and the tolerance allowed 0.002-inch.

The burrs are filed from the cams in a special machine and then the three main bearings are polished with fine abrasive paper. The diameter of the gear post is finish ground to within 0.0005-inch on a plain grinding machine at the rate of 50 per hour. Following that operation a champfer is ground on the gear post at the rate of 115 per hour with a wheel 14 inches in diameter.

Then a lead is ground on the outside diameter of the flange on a plain grinding machine. Approximately 150 pieces are ground per hour. After the lead grinding operation the outside face to the flange is rough ground on a plain grinding machine at the rate of 60 per hour. Finish grinding the outside face of the flange is performed on a similar type machine to within 0.001-inch limit. The wheel used is 18 inches in diameter with a ¾-inch face.

The inside face of the flange is finish ground on an automatic grinding machine containing a cylindrical, rotating jig with openings for 10 shafts. Grinding is performed at the rate of 180 per hour. Following that operation the threads are cut on the gear post and then the outside face of the flange is finish ground on a plain grinding machine at the rate of 180 per hour. The camshaft is placed in a high pressure, continuous washing machine which removes any grinding compound remaining on the shafts, following which the shafts pass through the final inspection.

As mentioned previously, the 8-cylinder camshafts are handled differently than those for the 4-cylinder models. After the three main bearings are semifinish ground, the shafts are placed in an automatic, hydraulic cam grinding machine which rough grinds all the cams, one after the other, without attention from the operator. Hence, one man can operate three or four machines. Production rate is 8 per hour. After the cams are rough ground the inside face of the flange is semifinish ground on a plain grinder at the rate of 40 per hour. Then the outside diameter of the flange is semifinish ground on a similar machine at the rate of 60 per hour.

The diameter of the gear post is semifinish ground, and then the inside of the flange is ground. That operation is performed at the rate of 40 per hour and the operation is held to a tolerance of 0.0001-inch in the length between the inside of the flange to the gear seat which butts up against the rear bearing. The eccentric is semifinish ground on a plain grinding machine. Production rate is 50 per hour. Finish grinding the eccentric is performed at the rate of 75 per hour and the operation is held within 0.004-inch limit.

Bearings Given Finish

The three main bearings are finish ground on a machine containing three wheels on one spindle. The wheels are 36 inches in diameter. Production rate is 80 per hour and the tolerance is 0.001-inch. The outside diameter of the flange is finish ground on a plain grinding machine at the rate of 40 per hour. and grinding is held to within 0.0005-inch limit.

Burrs are removed from the cams and the bearings polished in the same manner as described for the 4-cylinder camshafts. The the inside face of the flange is polished with a fine grit wheel 14 inches in diameter with a 1¼-inch face. About 0.002-inch stock is removed in the grinding or polishing.

Other grinding operations such as finish grinding the diameter of the gear post, finish grinding the outside face of the flange and the like, are similar to those performed on the 4-cylinder camshafts. Then the 8-cylinder camshafts are placed in the high pressure, continuous washer and given a close inspection. After inspection the projection which formed the center holes for the various operations is turned off, and finished on a lathe. Then the timing slot is milled in the proper position, and the burrs are filed off. When those operations are finished, the camshaft is placed in the assembly line.

Designing Welded Structures For High Joint Efficiency

BY EVERETT CHAPMAN
Lukenweld Inc.

Part II

CORRECT drafting room practice and heat treatment are of major importance in designing welded rolled steel structures for high efficiency of joints. These factors are discussed in detail in the accompanying article, the second and concluding portion of a noteworthy paper on welded joints presented at the fifty-fourth annual meeting of the American Society of Mechanical Engineers in New York, Dec. 5-7. Part I, appearing in the Dec. 11 issue of STEEL, *considered joint failures and their causes as explained by photoelastic studies. The author is vice president in charge of engineering, Lukenweld Inc., division of Lukens Steel Co., Coatesville, Pa.*

CORRECTION of the destructive factors which are present in nonhomogeneous welded joints simply revolves around two elements: First, drafting room practice; and second, heat treatment. As it is concerned with the design of the joints, drafting room practice must be supervised carefully to insure that none of the defects or defects of types shown in the examples presented in the preceding installment of this article are allowed to creep into the structure.

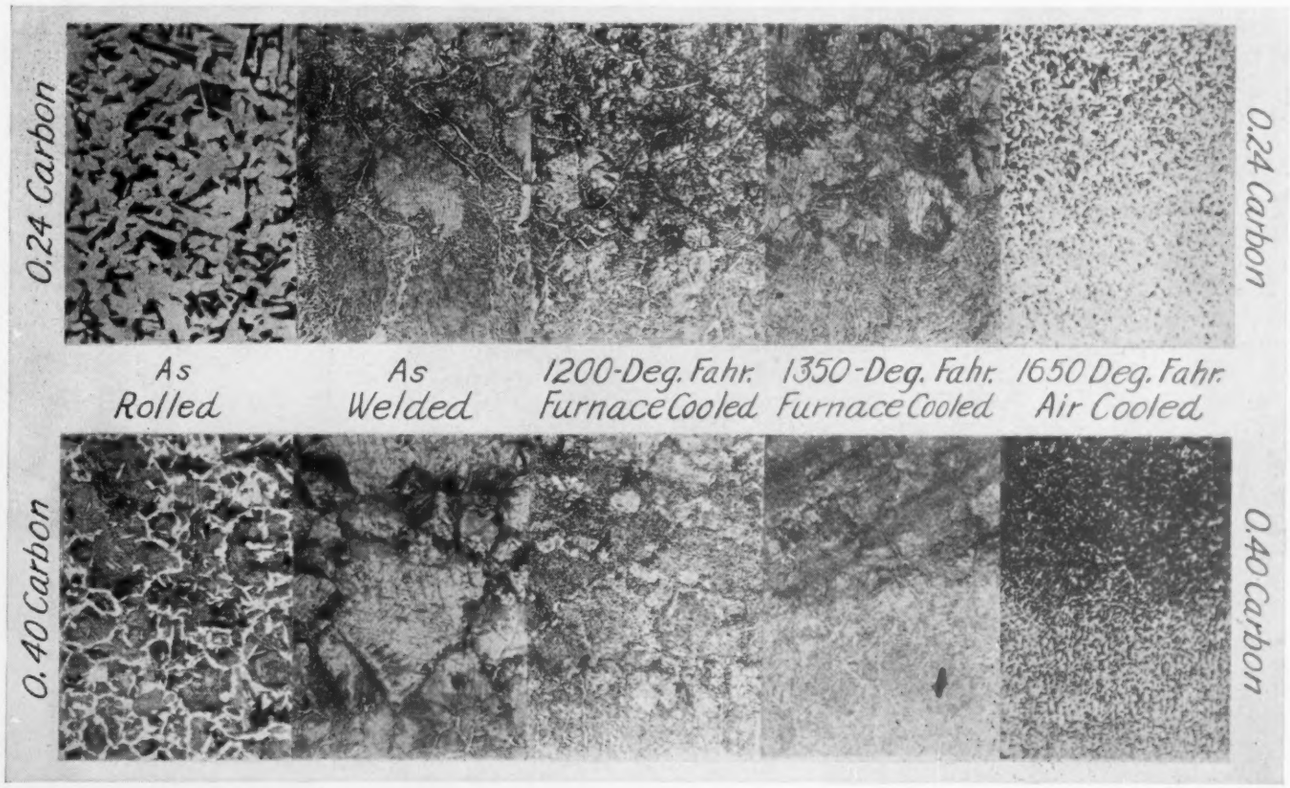
Design practice can no more afford to neglect the stress distribution in the joint than it can afford to neglect the stress distribution throughout the gross body of the structure. In fact, the problem is more acute in the case of the joints, simply because of the fact that the variables entering into the production of a joint are less standardized than those which enter into the manufacture of the steel plate.

The effect of a notch in breaking brittle material under a single load is only too well known in the case of the age-old method of breaking glass. The equivalent effect in a ductile material is not marked when the load is applied only once, but the exact effect is duplicated when the load is of a repeated nature. It is astonishing that, in view of this fact, notches as a species do not seem to be generally recognized. It is only a notch in a particular form which has caused trouble that receives any recognition.

It is well-known that prick punch marks and scriber marks and stamped initials must not be applied to locomotive or airplane components. Just why the identical phenomena, in the shape of undercuts and unwelded boundaries and triangular weld contours, are blissfully incorporated in high-duty welded structures is difficult to explain. It is the reason, however, why welded steel structures have failed.

Correction of damage to parent metal necessitates a heat treatment after the structure has been welded. The accompanying series of photomicrographs illustrates the effect of welding, stress-relief, and treatment at the two critical temperatures, of two pieces of steel of different carbon contents. The specimens were

(Please turn to Page 43)



Series of photomicrographs of 0.24 and 0.40 per cent carbon steel plates 2 inches thick in the as rolled, as welded and heat treated conditions. Welding affects the structure of the parent metal adversely and makes stress relieving necessary to refine the grains and restore ductility

The Plastic Forming Of Metals

By PROFESSOR DR.-ING. ERICH SIEBEL
Translated by JOHN H. HITCHCOCK

Part II—Forces and Flow of Material in Technical Forming Processes

4. Useful and Friction Work in Rolling*

BASED on the equilibrium of forces between bar and rolls, when the rolls rotate with constant peripheral velocity, the resultant force which the bar exerts upon the rolls must act vertically, as long as no forces in the longitudinal direction are applied to the bar outside the region of contact (see Fig. 60). If the resultant force is applied to the rolls at a distance, a, from the point of delivery, it produces a torque upon each roll which is equal to $\frac{M}{2} = D \times a$.

The drive accordingly must provide a torque, corresponding to the pure rolling work, equal to:

$$M = 2\,D \times a \quad \text{.....(38),}$$

in order that the rolling process may continue. With a peripheral roll velocity, u, and an angular velocity, $\omega = \frac{u}{r} = \frac{\pi n}{30}$, the power for pure rolling accordingly amounts to:

$$L_w = M \times \omega = 2\,D \times a \times \omega \quad \text{.....(39a).}$$

In a similar manner, the pure rolling work during the rotation of the rolls through an angle α is calculated as:

$$A_w = M \times \alpha = 2\,D \times a \times \alpha \quad \text{.....(39b),}$$

in which the angle α, through which the rolls turn during the delivery of a length l_1 of the material, can be assumed, considering forward slip, as

$$\alpha = 0.9 \text{ to } 1.0\,\frac{l_1}{r}.$$

Between the separating force and the rolling power or the pure rolling work, are simple relations which were known by E. Blass[6] as early as 1881. The relations can be evaluated as soon as the point of application of the resultant force, which the bar exerts upon the rolls, is known. The resultant force may be assumed to act

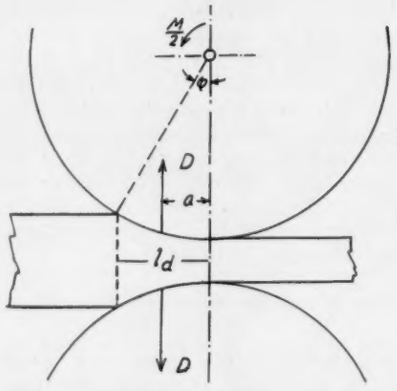


Fig. 60—Equilibrium of forces applied to rolls

in the vicinity of the center of gravity of the contact area, and accordingly, neglecting a possible change in the width of the bar, at a distance from the point of delivery equal to one-half the contact length, l_d.

The described assumption is confirmed if equal vertical pressure (deformation resistance) is applied over the entire area of contact, as shown in Fig. 61a. Uniform pressure distribution during rolling does not exist in actuality. The deviations from uniformity, however, probably are not usually of such a nature that they produce an appreciable change in the location of the point of application of the resultant force. If the limiting case is examined in which the force of the rolled material, acting perpendicularly to the axis of the bar, increases linearly from zero at the point of entrance to a maximum value at the point of delivery, as shown in Fig. 61b; the values of the torque, rolling power and rolling work, calculated according to the derived formula with $a = \frac{l_d}{2}$, become 33 per cent too high, or with reversed procedure, the vertical stresses become 33 per cent too low. The error, however, decreases to one-third of this value if the vertical pressure increases linearly from a stated value at the point of entrance to a value twice as great at the point of delivery, as shown in Fig. 61c. In accordance with the theory of the rolling process, which was developed in the preceding chapter, it may be assumed that the actual pressure distribution in the region of contact is approximately as shown in Fig. 61d. The error introduced by assuming that $a = \frac{l_d}{2}$ then becomes still smaller.

An exact statement concerning the position of the point of application of the separating force can be made by equating the pure rolling work, determined from equation (39b), to the deformation work calculated from equation (24) as the product of the deformation resistance and the displaced volume. By this means, the equation is obtained:

$$V \times [\phi_h] \times K_f = V \log_e \frac{h_0}{h_1} K_f = 2\,D\,a\,\alpha.$$

During rolling, the following relation is also valid:

$$V = l_m \times h_m \times b_m,$$

in which l_m, h_m and b_m represent the geometric mean values of the initial and final dimensions of the material for the pass in question. The error involved by the approximation:

$$l_m \times \frac{h_0}{h_1} \doteq \frac{h_0 - h_1}{h_m} = \frac{\triangle h}{h_m}$$

is less than 2 per cent, up to a re-

(*Please turn to Page 44*)

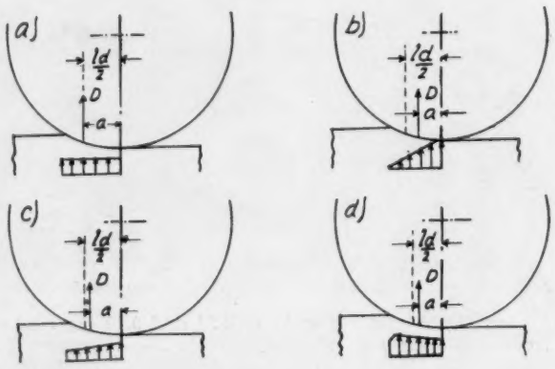


Fig. 61—Influence of distribution of pressure on position of resultant compressive force

*Developed according to E. Seibel and A. Pomp[10].

Youngstown

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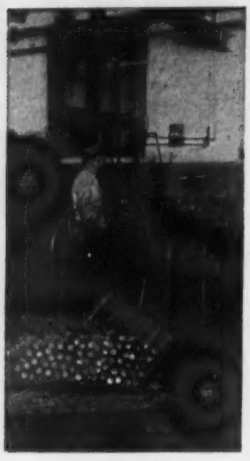
Making the Most of

METHODS AND MATERIALS



CONFRONTED with the need for a crane dog gear or ratchet 18½ inches outside diameter and 2 inches thick and having a 10½-inch diameter inside hole, a well-known railway shop decided to produce it by cutting it from a 2-inch steel slab, using oxyacetylene machine cutting. A cost record of the job is not available, but an analysis of the cost of duplicating it is of interest. A 20-inch square slab of steel 2 inches thick would weigh 115 pounds and would cost $4.45. Shaping of the teeth would require about 98 inches of cutting and the hole about 33 inches, thus 55 cubic feet of oxygen and 6 cubic feet of acetylene would be used, costing 55 cents and 12 cents respectively. One hour of labor at 75 cents, 3 hours for a draftsman, $2.25 and $4 overhead on labor and machine would bring the total cost to $12.12. If the gear had been made from a forging and machined in the conventional manner, the cost by conservative estimate would have exceeded $80 and might have been as much as $100.

$ $ $

In the oil drilling and pumping industry, the numerous failures of sucker rods, drill pipe and other tubular products are attributed to corrosion fatigue. Consequently, much attention is being directed to this subject. Preliminary results of a recent investigation indicate that paint films definitely increase the life of metal subject to corrosion fatigue. Without any coating, the specimen usually failed in less than one-fourth the time under the same conditions.

$ $ $

TO PREVENT harmful effect of chromium upon workmen engaged in chromium plating, strict cleanliness of work places, floors, apparatus and tools is an important feature. Articles should be transferred from vat to tank and from tank to racks with a minimum of dripping. It has been recommended that the floor in the vicinity of the processes be covered with sawdust and that this be renewed daily. Soiled work places should be cleaned frequently and the production of dust must be controlled.

$ $ $

Researches have demonstrated that a plain carbon steel of eutectoid composition—approximately 0.85 per cent carbon content—has to be cooled from about 1300 degrees Fahr. down to 400 degrees, or through a range of 900 degrees, within 6 seconds to obtain thorough hardening and maximum grain refinement. This means that the carbon steels will not fully harden except under sufficiently drastic quenching to complete the transformation in this very limited time. Obviously, air hardening is impracticable with such materials, and even oil quenching often is ineffective. In thick sections, the large mass of metal prevents the quenching effect from

penetrating to the inner portions and therefore only a small area on the outside is hardened. One of the effects in adding nickel to steel is to retard the rates of transformation. In a 3 per cent nickel, 1.50 chromium cast steel, for example, hardening time limit is about 500 seconds, as compared with the 6 seconds referred to above for a cast carbon steel. Hence, the nickel-chromium steel can be hardened throughout in sections which, with the unalloyed steel, would be hard only on the outer rim. Armor plate, which is hardened to depths of several inches, usually contains from 3 to 4 per cent nickel.

$ $ $

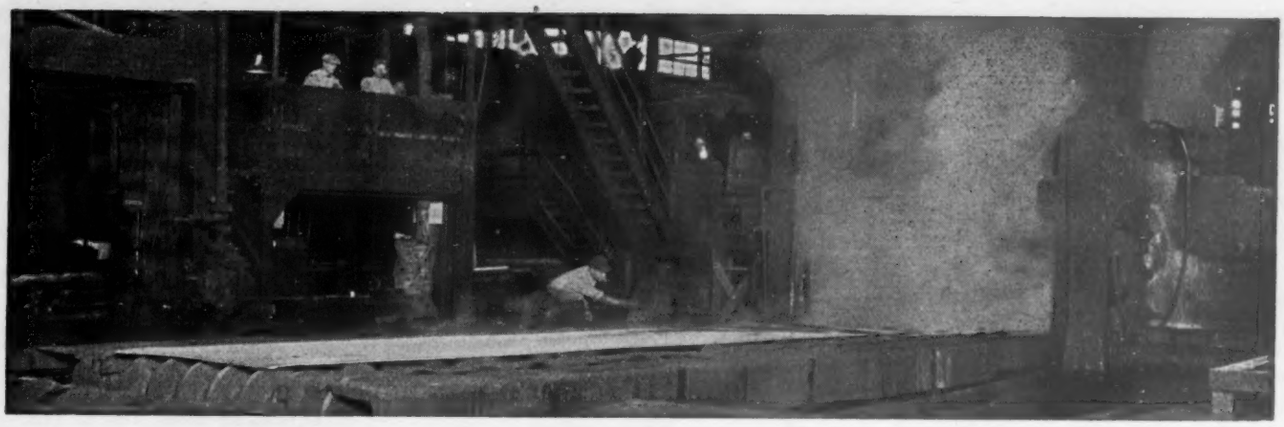
Steels containing 22 to 25 per cent chromium and 10 to 15 per cent nickel have found many uses as castings and rolled products, resisting corrosion and creep as well as the oxidation encountered at temperatures as high as 1830 degrees Fahr. In the manufacture of cotton cloth this steel has given good service in the form of single rolls, which operate at temperatures in the neighborhood of 1470 to 1650 degrees Fahr. and are used to burn fibers from the surface of the cloth. Castings of these steels have served satisfactorily as liners for kilns and feed pipes in the manufacture of cement, as well as in the form of furnace parts not required to operate in high sulphur atmospheres.

$ $ $

A MANUFACTURER in Sheffield, England, has invented and patented a knife grinding machine by means of which a number of knife or scissor blades can be ground simultaneously. The machine is hydraulically operated and is said to be capable of grinding one side of 20 gross of table knife blanks a day. It does the work of several ordinary knife grinding machines.

$ $ $

In preparing for the welding of a 2-inch gasoline pipe line, an effort was made to reduce the cost of cutting and beveling the pipe below 12 cents per joint, a joint being figured as two cuts. The best contract price offered for machine cut and beveled pipe was 25 cents per joint. Finally it was decided to mount the pipe beveling machine on a short piece of 4-inch pipe which would be provided with a centering piece inside, and lugs outside to hold it stationary. The 2-inch pipe to be beveled was to be placed inside the 4-inch pipe fixture, resting on the centering piece, and the machine then revolved around it in the usual manner. The 4-inch pipe thus was simply to serve as a support for the beveling machine which would permit it to be pushed around the 2-inch pipe easily and make smooth true cuts. The fixture was constructed quickly, was simple and efficient and cost little. With its use, cost of beveling the pipe was reduced to less than 5 cents per joint. On 2-inch black line pipe 727 cuts were made in 9 hours; actual cutting time was 22 seconds and elapsed time 40 seconds. Galvanized pipe required more time, 661 cuts being made in 9 hours.



PROGRESS IN STEELMAKING

REMOVING oils and greases from the surfaces of sheet, strip and other steel commodities in an extremely damp condition can be effectuated by the application of a recently marketed high-powered solvent.

BOLTS for ordinary steelworks ladle stoppers should be approximately 1¼ inches diameter and made from steel of low-carbon content, preferably 0.05 per cent, according to a recent investigation. When pouring large tonnage open-hearth heats, the bolts should be used only once. They should fit snugly in the rods and stopper and should be keyed to the rod with heavy low-carbon keys. The most efficient results are obtained when the stopper is in contact with the end of the rod.

♦ ♦ ♦

Equipment for mechanizing conventional type 2-high hot sheet mills has been developed by a sheetmaker in the Mahoning valley. The roller's side of the mill is served by a conveyor table built with a set of two chains continuously separating toward the rolls. The latter deliver the sheet onto a catcher table which is built with two sets of conveyor chains. Each pair operates continuously, one toward and the other away from the mill. When a sheet is received by the catcher's table and is moved a predetermined distance away from the mill, the central section of the table tilts upward, its conveyor chain taking control of the sheet and returning it over the top of the upper roll to the roller's side. Meanwhile, a pair of skids, centrally located between the feeder conveyor chains, is elevated a few inches and receives the sheet or pack being returned from the catcher's side of the mill. The skids returning to their lower position are relieved of the sheet by the conveyor chains which again move it into the gap of the rolls.

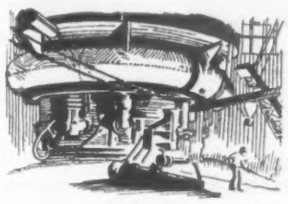
♦ ♦ ♦

High economy in operating and investment costs is claimed for a recently improved wire baker which is equipped with three small burners, each firing into a 2-pass combustion chamber. The first pass is built of cylindrical high-radiant refractory, and the second pass of finned pipe, thus affording ample radiating surfaces. Heat is transferred by recirculating convection heat, vents and fresh air intakes being provided to control the humidity in the baking compartment.

EACH 10 per cent increase in the mold wall area will increase the rate of transverse solidification of ingots of any shape and area by approximately 2 per cent, according to tests made at an open-hearth shop in the Buffalo district.

♦ ♦ ♦

Cemented tungsten carbide now is being applied to valve stems and seats of hydraulic presses, rams, pumps, intensifiers and other equipment which requires replacement because of abrasion and high pressure. Maintenance costs are greatly reduced. A tip of the alloy is brazed on the point of the valve stem; a ring of the alloy serves as the valve seat. Sufficient hardness and compressive strength is possessed by the inserts to withstand the abrasion and pressure encountered.



IRON has about the same percentage of carbon at the tuyere level as when tapped from the blast furnace, according to a research into chemical reactions conducted at a stack in Germany. The carbon content decreases about 1 per cent as the metal passes through the blast stream, but this amount is restored by the time the iron arrives at the level of the cinder notch. Manganese undergoes a similar reaction. Almost all the silicon is reduced in the hearth of the furnace. Phosphorus is oxidized in front of the tuyeres, but later is reduced and again combines with the iron somewhere between the level of the tuyeres and slag notch. Sulphur in front of the tuyeres may be as high as 30 per cent and yet may only be about 0.02 per cent in the metal as cast.

♦ ♦ ♦

Protective action of paint is much greater when applied to the surface of corrosion-resistant steels than when applied to steels of ordinary quality.

♦ ♦ ♦

Shoes for a 22-inch structural mill in the Pittsburgh district recently were built of rolled steel, employing welded construction. Figuring the steel at present market prices, a saving of 32.2 per cent was effected.

NEW EQUIPMENT

PRODUCTION FABRICATION
TREATMENT FINISHING

Designs Chuck for Use on Light-Duty Lathes

Westcott Chuck Co., 326 East Walnut street, Oneida, N. Y., is manufacturing a new light-duty I.X.L. independent lathe chuck, shown herewith. Outstanding features include strength, lightness and minimum overhang. The body is high strength close grain nickel iron. Jaws are of case hardening steel. They are hand fitted to the chuck and have raised and accurately ground stops. The long end of each jaw is serrated so that when the jaws are reversed they

Westcott light-duty I.X.L. independent lathe chuck

will grip bars, etc. Jaw screws are threaded their full length except where they are necked for the bearings. They have mortised heads to take a square-end T-handle wrench. The sizes now available include 3, 4, 5 and 6-inch, all with four reversible jaws.

♦ ♦ ♦

Governor Prevents Drill Motor from Racing

Independent Pneumatic Tool Co., 600 West Jackson boulevard, Chicago, has introduced a new rotary type tool that is built to eliminate rough and broken threads and leaky staybolts. This boiler shop drill is equipped with power blades, has governor controlled air consumption and speed, and is light in weight. Motor is prevented from racing when starting the tap.

♦ ♦ ♦

Pyrometer Measures Surface Temperature of Rolls

Illinois Testing Laboratories Inc., 141 West Austin avenue, Chicago, has introduced a new roll-type pyrometer for measuring surface temperatures of revolving rolls and cylinders. As shown in the illustration, the unit is self-contained. The indicator is mounted in a supporting arm which also holds the ribbon-type ther-

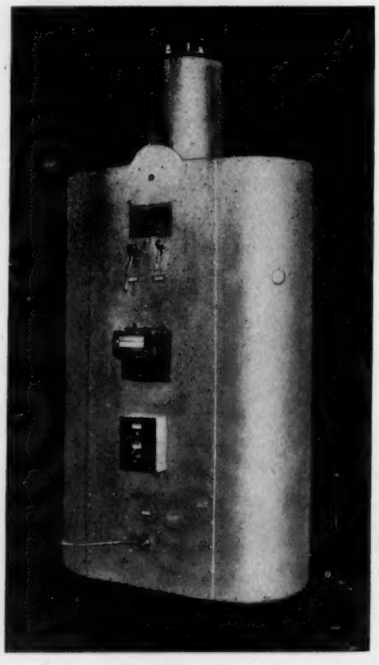
Roll-type pyrometer developed by Illinois Testing Laboratories Inc.

mocouple. A grooved carbon block is attached to the thermocouple assembly which allows only a definite amount of tension to be applied to the thermocouple. Being provided with three adjustments the thermocouple assembly can be turned in either direction in relation to the extension arm in three different positions and held in place by set screws. The indicator consists of a millivoltmeter having a case diameter of 4½ inches. Scale length is 3½ inches and can be graduated either 0-600, 0-800 or 0-1000 degrees Fahr.

♦ ♦ ♦

Unit Dries Air, Gases for Industrial Processes

Pittsburgh Lectrodryer Corp., P. O. box 1008, Pittsburgh, is introducing Lectrodryers operating under the



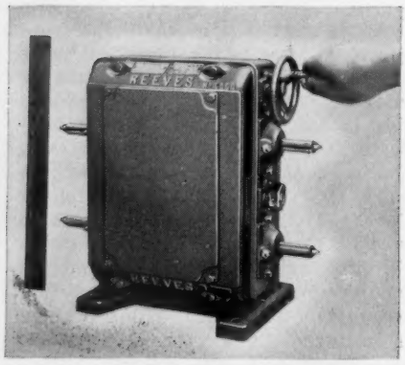
Lectrodryer utilizes adsorption process to dry air and gases

new "activated alumina system" to effectively dry air and gases by the process of adsorption. Air saturated with moisture when passed through the unit, shown herewith, comes out with a dewpoint below minus 60 degrees Cent. Many processes for the annealing of metals in controlled atmosphere require that the annealing atmosphere be partially or completely freed of moisture. The Lectrodryer is readily adjustable to standard or special processes for the preparation of annealing gases and is available in standard sizes so that it can be easily substituted for present chemical or refrigeration units for drying. For continuous delivery of dried air or gas the equipment is built in dual units, one adsorber being in service while the other adsorber is on reactivation. The shift of one lever once or twice a day serves to cut the adsorbers in and out of service. All valves and electrical connections are so interlocked that the correct sequence of pressure is assured. Applications include use in steel mills for bright annealing.

♦ ♦ ♦

Compact Design Features Variable Speed Unit

Reeves Pulley Co., Columbus, Ind., has developed a completely enclosed vertical design of variable speed transmission, less than 14 inches in over-all length. The unit, shown herewith, is particularly recommended for upright installations of limited space and low horsepower requirements and in which severe conditions of service may be encountered. The cast iron case completely protects the operating parts of the transmission from such destructive elements as water, chemical fumes, abrasives. Overall width, not including handwheel, 11¼ inches; thickness, including feet, 7-7/16 inches; provides infinite speed adjustment in ranges of from 2:1 to 6:1. Capacity, ⅛ to ⅜ horsepower.



New vertical type Reeves variable speed transmission

Year Closing with Rate Up, Bright Outlook

Strong Situation for Final Week, Despite Holidays, as Pressure for Shipments Continues—Heavier Automotive, Railroad, Structural Demands Just Ahead

STILL squarely at variance with the seasonal trend, steelworks operations last week rose 5 points to 38 per cent, and holiday observance will scarcely impair this week's showing, because of the rigid Dec. 31 deadline on shipments against expiring contracts.

Some producers will open January with all unfilled tonnage automatically canceled and with few first quarter commitments, and for them widespread shutdowns may result in the early part of the month. Others, especially those manufacturing products on which prices are not advanced Jan. 1, and those which depleted their stocks recently in the rush to complete contracts, look for only a mild recession.

This does not diminish the outlook for the entire first quarter, which is viewed encouragingly. It is a helpful factor for late January and the remainder of the first quarter that specifications for new automobile models have been delayed, and the void this month filled by specifications of a general character. Beginning about Jan. 15 automotive releases should expand sharply and carry through until spring.

A December with shipments highest for the month in many years, and heavier demands just ahead, has greatly strengthened the morale of the industry. Railroad orders are mounting steadily, a substantial portion of the requirements to provide work for the mills in January; structural needs are on the ascendency, and still larger tonnages assured for early release.

Chicago Rail Mills Resume; Commerce Commission Approves Loans for Heavy Orders

Placing of 25,000 tons of rails by an unidentified western road has enabled Chicago mills to resume production. Other rail orders include 12,000 tons for the Delaware, Lackawanna & Western, and 3183 tons for the Lehigh & New England. Detroit United Railways has ordered 1330 tons of steel ties. Baltimore & Ohio is negotiating a loan to buy 50,000 tons of rails, and the interstate commerce commission has approved loans for the Chicago & North Western to purchase 65,000 tons of rails and 18,000 tons of accessories; for the Chicago & Eastern Illinois to buy 4000 tons of rails and fastenings; and Pittsburgh & West Virginia, 1000 tons.

The railroad equipment market also is more active. Lehigh & New England is negotiating with builders for 500 freight cars; Central of Georgia, 200 coal cars; Lehigh Valley, repairs to 2000 cars; and New York, New Haven & Hartford for repairs to 1200. Northern Pacific has placed ten locomotives.

Structural shape awards for the week, 17,250 tons, are well above the weekly average for 1933. Bids are being taken on 15,000 tons for the Pennsylvania's speed line over the Delaware river bridge at Philadelphia. For Mississippi river locks 16,000 tons addtional are about to be awarded.

Navy To Release 32,000 Tons of Steel; Raw Materials in Strong Position

Releases are expected soon after Jan. 1 on 32,000 tons of shapes and plates for navy work, contracts for which were let last summer. The Pennsylvania railroad has definitely awarded 4500 tons of plates and other materials for 500 freight cars to be built in its own shops. Two tank ships for the Standard Socony Transportation Co., New York, up for figures, will require 5700 tons of plates, shapes and bars. The navy is taking bids Jan. 3 on 5280 tons of armor plate.

A strong situation prevails in the scrap market, with prices up in all districts. More inquiries are out from blast furnaces for coke. Few cancellations have been made on fourth quarter contracts for pig iron.

Further price advances announced to become effective Jan. 1 include $3 a ton on ferromanganese and ferrosilicon, and $5 on silicomanganese; while spiegeleisen, under foreign competition, is down $1. Advances on stove bolts and cap and set screws now are in effect.

Steelworks operations last week advanced 12½ points to 38 per cent at Buffalo; 10½ to 40 at Chicago; 10 to 51 at Wheeling; 3 to 26 in eastern Pennsylvania; 3 to 39 at Youngstown; 1 to 29 at Pittsburgh; and 1 to 72 in New England. They were unchanged at 52 per cent both at Detroit and Birmingham, and down 2 points to 57 at Cleveland.

STEEL's iron and steel composite remains $32.42; the finished steel composite, $51.10; while the scrap index is up 33 cents to $10.50.

COMPOSITE MARKET AVERAGES

	Dec. 23	Dec. 16	One Month Ago Nov., 1933	Three Months Ago Sept., 1933	One Year Ago Dec., 1932	Ten Years Ago Dec., 1923
Iron and Steel Composite	$32.42	$32.42	$31.59	$31.30	$28.93	$43.02
Finished Steel Composite	51.10	51.10	49.20	48.52	46.74	67.53
Steelworks Scrap Composite	10.50	10.17	9.64	10.83	6.41	16.00

Iron and Steel Composite:—Pig iron, billets, slabs, sheet bars, wire rods, tin plate, nails, sheets, plates, shapes, bars, and black pipe. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

	Dec. 23, 1933	Nov. 1933	Sept. 1933	Dec. 1932
Finished Material				
Steel bars, Pittsburgh	1.75	1.75	1.60	1.60
Steel bars, Chicago	1.80	1.80	1.70	1.70
Steel bars, Philadelphia	2.04	2.04	1.91	1.91
Iron bars, Chicago	1.60	1.60	1.60	1.65
Shapes, Pittsburgh	1.70	1.70	1.60	1.55
Shapes, Philadelphia	1.90	1.90½	1.81½	1.75
Shapes, Chicago	1.75	1.75	1.65	1.70
Tank plates, Pittsburgh	1.70	1.70	1.60	1.60
Tank plates, Philadelphia	1.88	1.88½	1.79½	1.79½
Tank plates, Chicago	1.75	1.75	1.65	1.70
Sheets, No. 10, hot rolled, Pitts.	1.75	1.75	1.70	1.70
Sheets, No. 24, hot ann., Pitts.	2.25	2.25	2.25	2.10
Sheets, No. 24, galvan., Pitts.	2.85	2.85	2.85	2.85
Sheets, No. 10, blue anneal., Gary	1.85	1.85	1.75	1.80
Sheets, No. 24, hot anneal., Gary	2.35	2.35	2.35	2.20
Sheets, No. 24, galvan., Gary	2.95	2.95	2.95	2.85
Plain wire, Pittsburgh	2.20	2.10	2.10	2.20
Wire nails, Pittsburgh	2.35	2.10	2.10	1.95
Tin plate, per base box, Pitts.	5.25	4.65	4.65	4.25
Semifinished Material				
Sheet bars, open-hearth, Youngs.	26.00	26.00	26.00	26.00
Sheet bars, open-hearth, Pitts.	26.00	26.00	26.00	26.00
Billets, open-hearth, Pittsburgh	26.00	26.00	26.00	26.00
Wire rods, Pittsburgh	36.00	35.00	35.00	37.00

	Dec. 23, 1933	Nov. 1933	Sept. 1933	Dec. 1932
Pig Iron				
Bessemer, del. Pittsburgh	19.26	19.26	19.26	15.76
Basic, valley	17.00	17.00	17.00	14.00
Basic, eastern, del. eastern Pa.	18.76	17.76	17.76	13.75
No. 2 foundry, del. Pittsburgh	18.76	18.76	18.76	15.76
No. 2 foundry, Chicago	17.50	17.50	17.50	15.50
Southern No. 2, Birmingham	13.50	13.50	13.50	11.00
No. 2X, Eastern, del. Phila.	19.63	18.63	18.63	14.26
Malleable, valley	17.50	17.50	17.50	14.50
Malleable, Chicago	17.50	17.50	17.50	15.50
Lake Superior charcoal, del. Chi.	23.54	23.54	23.54	23.04
Gray forge, del. Pittsburgh	18.38	18.38	18.26	15.63
Ferromanganese, del. Pittsburgh	87.24	87.24	87.24	73.24
Scrap				
Heavy melting steel, Pittsburgh	$12.75	11.65	13.00	8.70
Heavy melting steel, eastern Pa.	11.00	9.56	10.50	7.25
Heavy melting steel, Chicago	9.50	8.35	9.95	5.45
No. 1 wrought, eastern Pa.	11.75	10.15	11.00	7.25
No. 1 wrought, Chicago	8.70	8.10	9.25	5.05
Rails for rolling, Chicago	10.25	10.25	11.25	8.25
Coke				
Connellsville, furnace, ovens	3.75	3.75	2.50	1.75
Connellsville, foundry, ovens	4.25	4.25	3.15	2.50

Steel, Iron, Raw Material and Metals Prices

Prices conform to American Iron and Steel institute schedules. Asterisks denote price changes this week

Sheet Steel

HOT ROLLED No. 10
(24 to 48 inches wide)

Pittsburgh, base	1.75c
Gary, base	1.85c
Chicago, del.	1.88c
New York, del.	2.08c
Philadelphia, del.	2.04c
Birmingham, base	1.90c
St. Louis, del.	2.07c

HOT ROLLED ANN. No. 10

Pittsburgh, base	1.90c
Gary, base	2.00c
Chicago, del.	2.03c
Philadelphia, del.	2.19c
New York, del.	2.23c
St. Louis, del.	1.97c
Birmingham, base	2.05c
F.o.b. cars, dock Pacific ports	2.42½c

HOT ROLLED ANN. No. 24

Pittsburgh, base	2.25c
Gary, base	2.35c
Chicago, del.	2.38c
Detroit, del.	2.45c
New York, del.	2.58c
Philadelphia, del.	2.54c
Birmingham, base	2.40c
St. Louis, del.	2.57c
F.o.b. cars, dock, Pacific ports	2.95c

GALVANIZED No. 24

Pittsburgh, base	2.85c
Gary, base	2.95c
Chicago, del.	2.98c
Philadelphia, del.	3.14c
New York, del.	3.18c
Birmingham, base	3.00c
St. Louis, del.	3.17c
San Francisco, f.o.b. cars, dock	3.55c

TIN MILL BLACK No. 28

Pittsburgh, base	2.65c
Gary, base	2.75c
St. Louis, del.	2.97c

COLD ROLLED No. 10

Pittsburgh, base	2.30c
Detroit, delivered	2.50c
Gary, base	2.40c
Philadelphia, del.	2.59c
New York, del.	2.63c

COLD ROLLED No. 20

Pittsburgh, base	2.75c
Detroit, del.	2.95c
Gary, base	2.85c
Phildelphia, del.	3.04c
New York, del.	3.08c

ENAMELING SHEETS

Pittsburgh, No. 10	2.45c
Pittsburgh, No. 20	2.90c

Tin and Terne Plate

Per 100-lb. box, Pittsburgh. Gary base, 10 cents higher

Tin plate, coke base, contract	$5.25
* Do., stock	4.55
Long ternes, No. 24 unassorted	3.25c

Corrosion and Heat Resistant Alloys

Base, Pittsburgh

18% chrome, 8% nickel; sheets, 35c; plates, 31c; bars, 28c.

	A	B	C	D
Bars	17c	18.5c	21c	26c
Plates	20c	21.5c	24c	29c
Sheets	25c	28c	31c	35c
Hot strip	17c	18.5c	21c	26c
Cold Strip	22.5c	24c	27c	35c

Carbon 0.12 and under; no nickel. A has chrome 15% and under. B over 15/18% inc., C over 18/23% inc., D over 23/30%.

Steel Plates

Pittsburgh, base	1.70c
New York, del.	1.98c
Philadelphia, del.	1.88½c
Boston, del.	2.10c
Buffalo, del.	1.93½c
Chicago, base	1.75c
Cleveland, del.	1.88½c
Birmingham, base	1.85c
Coatesville, base	1.80c
Sparrows Pt., base	1.80c
Pacific Coast, f.o.b. cars, dock	2.25c
St. Louis, del.	1.97c

Structural Shapes

Pittsburgh, base	1.70c
Philadelphia, del.	1.90½c
New York, del.	1.95½c
Boston, del.	2.08½c
Bethlehem, base	1.80c
Chicago, base	1.75c
Cleveland, del.	1.88½c
Buffalo, base	1.80c
Birmingham, base	1.85c
Pacific Coast, f.o.b. cars, dock	2.25c

Bars

SOFT STEEL

Pittsburgh, base	1.75c
Chicago, base	1.80c
Birmingham, base	1.90c
Buffalo, base	1.85c
Cleveland, base	1.80c
Detroit, del.	1.90c
Pacific Coast ports, cars, dock, c.i.f.	2.30c
Philadelphia, del.	2.04c
Boston, del.	2.19c
New York, del.	2.08c
Pitts., forg. qual.	1.75c-2.25c

RAIL STEEL
To Manufacturing Trade

Pittsburgh	1.65c
Chicago	1.70c
Cleveland	1.70c
Gary, Ind.	1.70c
Buffalo	1.75c

IRON

Terre Haute, Ind., base	1.60c
Philadelphia, base	1.74c
Pittsburgh, refined	2.75c-7.50c

REINFORCING
New billet, cut lengths, carlots

Pittsburgh	1.90c
Chicago, Gary, Buffalo, Cleve., Birm., Young	1.95c
Gulf ports	2.30c
Pacific coast ports	2.45c
Philadelphia, del.	2.19c

Rail steel

Pittsburgh, base	1.75c
Chicago, Buffalo, Cleveland, Birm., Young.	1.80c
Gulf ports	2.15c
Pacific coast ports	2.30c

Wire Products □ □

(Prices apply to straight or mixed carloads; pool cars, or less, 10c up. 10% dis. on nail extras on straight or mixed carloads to one consignee.)

Base, Pittsburgh-Cleveland
(Per 100-lb. keg)

Standard wire nails	$2.35
Cement coated nails	2.35
Galvanized nails	3.85

(Per pound)

Polished staples	3.05c
Galvanized fence staples	3.30c
Barbed wire, galv.	2.85c
Annealed fence wire	2.35c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$60.00
Plain wire, 6-9 gage to mfg. trade	2.20c

Anderson, Ind., Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire	3.20c

Chicago and Waukegan $1 higher, Worcester $2 higher.

Cold-Finished Carbon Bars

(To be advanced Jan. 1)
Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs.	1.95c
20,000 to 59,999 lbs.	1.90c
60,000 to 99,999 lbs.	1.85c
100,000 lbs. and over	1.82½c

Chicago, Cleveland, Buffalo up 5c; Detroit up 20c; eastern Michigan up 25c.

Shafting □ □ □

(To be advanced Jan. 1)
Turned and ground, Pitts. base

1⅛-inch	3.25c
1⅛ to 1½-inch	2.75c
1⅛ to 1⅞-inch	2.60c
1⅛ to 2⅞-inch	2.45c
2⅛ to 6-inch	2.30c

Alloy Steel Bars □

Hot rolled
Pittsburgh, Buffalo, Chicago, Massillon, Canton 2.45c
Bethlehem 2.55c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 .15 to .25 Mo.	0.50
4600 .20 to .30 Mo. 1.25-1.75 Ni.	1.05
5100 .80-1.10 Cr.	0.45
5100 Cr. spring	base
6100 bars	1.20
6100 spring	0.70
Cr., Ni., Van.	1.50
Carbon van.	0.95
9250	carbon base plus extras

Strip and Hoops □

Hot strip to 23⅞-in. Pittsburgh	1.75c
Do., Chicago	1.85c
Do., del. Detroit	1.95c
Do., del. Phila.	2.04c
Do., del. N. Y.	2.08c
Cooperage hoop, Pittsburgh	1.85c
Do., Chicago	1.95c
Cold-rolled strip, Pitts., Cleve.	2.40c
Worcester	2.60c

Rails, Track Material □

(Gross Ton)

Standard rails, mill	$36.37½
Relay rails, Pitts. 20-45 lbs.	$26.00
50-60 lbs.	$23.00
70-75 lbs.	$18.00
80-85 lbs.	$24.00
100 lbs.	$25.00
Light rails, billet qual., Pitts., Chi.	$32.00
Do., reroll. qual.	$31.00
Angle bars, mills	2.55c
Spikes, R. R., base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs., up $2; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons or more; diff. for less.

Bolts and Nuts □ □

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate jobbing or large consuming trade for full case lots, Dec. 1, 1932, lists.

CARRIAGE BOLTS

All sizes, cut thread	70 off
Rolled thread, ½ x 6 and smaller	70 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts	70 off
Tire bolts	60 off
*Stove bolts, 70-25-10 off in pkgs.; 83 off in bulk, 5000 or more of a size.	
Rolled thread machine bolts, ½ x 6 and smaller	70 off
Step bolts	66 off
Elevator bolts	66 off

NUTS

Semifinished	70 off

HEXAGON CAP SCREWS

*Milled	80-10-10 off
*Upset 1-in., smaller	85 off

SQUARE HEAD SET SCREWS

*Upset, 1-in., smaller	75-10 off
*Upset, larger than 1-in.	75-10 off
*Headless set screws	75 off

Rivets, Wrought Washers

Struc., c.l., Pittsburgh, Cleveland	2.75c
Struc., c.l., Chicago	2.85c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 10 off
Wrought washers, Pitts., Chi., Phila.	6.00-6.25 off

Cut Nails, Piling □

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more; no discount on size extras	$3.00
Do., less than 5 kegs; no discount on size extras	$3.15
Steel piling, Pitts.	2.00c
Steel piling, Chi., Buff.	2.10c

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago delivered 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD
Steel

In.	Blk.	Gal.
¼ and ⅜	57	38½
½	62	50½
¾	65½	55½
1—3	67½	58½

Iron

½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

LAP WELD
Steel

2	63½	54½
2½—3	66½	57½
3½—6	68½	59½
7 and 8	67½	57½
9 and 10	67	57

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½
9—12	38	24½

LINE PIPE
Steel

⅛-inch, butt weld	50½
¼—⅜, butt weld	56
½, butt weld	61
¾, butt weld	64½
1—3, butt weld	66½
2-inch, lap weld	62½
2½—3, lap weld	65½
3½—6, lap weld	67½
7—8, lap weld	66½

Iron

⅛—1½ inch, black and galv.	take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe list. 8—12 inch no extra.

BOILER TUBES
C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3¾	50	3	17
4	52	3¾—3½	18
4½—6	42	4	20
1½	1	4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% discounts on steel and 10% on charcoal iron.

Lapwelded steel: Under 10,000 lbs., 6 pts. under base and one 5%; on 10,000 lbs. to carload, 4 pts. under base and two 5%. Quantity discounts same as for hot-rolled. Charcoal iron: Under 10,000 lbs., 2 pts. under base; on 10,000 lbs. to carload, base and one 5%.

SEAMLESS BOILER TUBES
Cold Drawn

2—2¼	27	3¼—3½	41
2½—2¾	34	4	46
3	38	4½, 5, 6	43

(On 1—1¾-inch sizes mechanical tubing dis. apply.)
Hot Rolled

2—2¼	33	3¼—3½	47
2½—2¾	40	4	49
3	44	4½, 5, 6	42

Quantity discounts: Under 10,000 lbs., 10 pts. and 5%; 10,000 to 24,999 lbs., 6 pts. and 5%; 25,000 lbs. to carload, 2 pts. and 5 and 5%; carload and over, base discount and 5 and 5%. No extra for lengths 24 ft. and under.

Seamless Tubing □

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,00 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe □

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$36.00-37.00
4-in., Birm.	39.00-40.00
4-in., Chicago	47.00-48.00
6 to 24 in., Chicago	44.00-45.00
6-in. & over, east. fdy.	40.00
Do., 4-in.	43.00

Class A pipe $3 over Class B. Stand, fitgs., Birm. base..$90.00

Six to 24-inch, fittings, base; over 24-inch plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, 5 higher.

Semifinished Steel □

Prices Per Gross Ton

BILLETS AND BLOOMS
4 x 4-inch base

Pitts., Chi., Cleve., open-hth. & bess.	$26.00
Philadelphia	31.30
Forging, Pitts., Chi.	31.00

SHEET BARS

Pitts., Cleve., Yong.	26.00
Chicago	26.00
Canton, O.	26.00

SLABS

Pitts., Cleve., Yong.	26.00

WIRE RODS

Pitts., Cleveland	36.00
Chicago	36.00

SKELP

All grades, Pitts. and Chicago	1.60c

Coke □ □ □

Price Per Net Ton

BEEHIVE OVENS

Connellsville fur.	$3.75
Connellsville fdry.	4.25
Connell. prem. fdry.	5.25
New River fdry.	6.00
Wise county fdry.	4.25- 5.00
Wise county fur.	3.50- 4.25

BY-PRODUCT FOUNDRY

Newark, N. J., del.	8.71- 9.31
Chi. ov., outside del.	8.50
Chicago, del.	9.25
New England, del.	10.50
St. Louis, del.	9.25
Birmingham, ovens	5.00
Indianapolis, del.	8.75
*Ashland, Ky., Connellsville basis	6.00
*Portsmouth, ovens, Connellsville basis	6.00
Buffalo, ovens	7.50- 8.00
Detroit, ovens	8.00
Philadelphia, del.	9.00

Coke By-Products □

Per gallon, producers' plants.

Tank lots

	Spot
Pure benzol	$0.22
90 per cent benzol	0.22
Toluol	0.30
Solvent naphtha	0.26
Commercial xylol	0.26

Per lb. f.o.b. New York

Phenol (200 lb. drums)	0.163c
Do., (100 lb.)	0.173c

Per lb., producers' plants

Naphthalene flakes and balls	6.00- 7.25

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.25

Pig Iron

Delivered prices do not include switching charges except as noted. No. 2 foundry iron is 1.75-2.25 silicon; 25-cent differentials apply for each 0.25 silicon above 2.25

Gross Tons

	No. 2 Fdry.	Malleable	Basic	Bessemer
Basing Points:				
Bethlehem, Pa.	$18.50	$19.00	$18.00	$19.50
Birdsboro, Pa.	18.50	19.00	18.00	19.50
Swedeland, Pa.	18.50	19.00	18.00	19.50
Sparrows Point, Md.	18.50	.....	18.00	.....
From Swedeland, Pa., del. to Phila.	19.26	19.76	18.76	.....
From Bethlehem, del. to Brooklyn	20.77	21.27	.....	.....
From Bethlehem, del. to Newark, N. J.	19.99	20.39	.....	.....
Basing Point:				
Everett, Mass.	18.50	19.00	18.00	19.50
From Everett, del. to Boston	19.00	19.50	18.50	20.00
Basing Point:				
Buffalo	17.50	18.00	16.50	18.50
From Buffalo, del. to Boston	19.00	19.50	18.50	20.00
Basing Points:				
Neville Island, Pa.	18.00	18.00	17.50	18.50
Sharpsville, Pa.	17.50	17.50	17.00	18.00
Youngstown, O.	17.50	17.50	17.00	18.00
From Neville Island, Pa., del. to Pittsburgh district	(Neville Island base, plus 63c to $1.13 switching charges)			
Basing Points:				
Erie, Pa.	17.50	18.00	17.00	18.50
Cleveland	17.50	17.50	17.00	18.00
Toledo, O.	17.50	17.50	17.00	18.00
Detroit	17.50	17.50	17.00	18.00
From Detroit, del. to Saginaw, Mich.	19.60	19.60	19.10	20.10
From Cleveland, del. to Akron, Canton, O.	18.76	18.76	18.26	19.26
From Toledo, del. to Mansfield, O.	19.26	19.26	18.76	19.76
Basing Point:				
Hamilton, O.	17.50	17.50	17.00	18.00
From Hamilton, del. to Cincinnati	18.51	18.51	18.01	19.01
Do., del. to Indianapolis	19.77	19.77	19.27	20.27
Basing Points:				
Duluth	18.00	18.00	.....	18.50
Chicago	17.50	17.50	17.00	18.00
Granite City, Ill.	17.50	18.00	17.00	.....
From Duluth, del. to St. Paul	19.94	19.94	.....	20.44
From Chicago, del. to Milwaukee	18.50	18.50	18.00	19.00
From Chicago, Toledo or Detroit, del. to Muskegon, Mich.	20.40	20.40	19.90	20.90
From Granite City, del. to St. Louis	(Granite City base, plus 50-cent switching charge)			
Basing Point:				
Birmingham, Ala.	13.50	.....	12.50	.....
From Birmingham, del. to:				
Boston	18.62	.....	18.12	.....
Newark, N. J.	19.58	.....	.....	.....
Brooklyn, N. Y.	20.39	.....	.....	.....
Baltimore	19.02	.....	18.52	.....
Philadelphia	18.88	.....	18.38	.....
Cleveland	19.64	.....	18.64	.....
*Cincinnati	18.13	.....	17.13	.....
Chicago	18.16	.....	19.14	.....
St. Louis	17.62	.....	17.50	.....
Basing Point:				
Provo, Utah	16.50	.....	.....	.....

LOW PHOS.

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.—$23.00. Basing point: Johnson City, Tenn.—$23.00

Philadelphia, standard and copper bearing 24.13

GRAY FORGE		CHARCOAL	
Valley furnace	17.25	Lake Superior fur.	20.50
Pitts. dist. fur.	17.75	Do., del. Chicago	23.54

SILVERY

Jackson County, O., base; 6%—$22.25; 7—$23.25; 8—$24.25; 9—$25.25; 10—$26.25; 11—$27.75.

BESSEMER FERROSILICON

Jackson County, O., base: 10%—$27.25; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25.

Iron Ore □ □

LAKE SUPERIOR ORE

Gross ton, 51½%, Lower Lake Ports

Old range bess.	$4.30
Mesabi bessemer	4.65
Old range nonbess.	4.65
Mesabi nonbess.	4.50
High phosphorus	4.40

EASTERN LOCAL ORES

Cents, unit, del. E. Pa.

Foundry and basic, 56-63%, con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-65% (nom.)	10.00-10.50

FOREIGN ORE

Cents per unit, f.a.s. Atlantic ports (nom.)

Foreign manganiferous ore, 45-55% iron, 6-10% man.	10.00
No. Afr. low phos.	9.50
Swedish basic, 65%	9.00
Swedish low phos.	9.50
Spanish No. Africa basic, 50 to 60%	9.00
Tungsten, spot, sh. ton unit, duty pd.	$14.00-14.25
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$18.00

Manganese Ore □

(Nominal)

Prices, not including duty, cents per unit, cargo lots.

Caucasian, 52-55%	22.00
So. African, 52%	21.00-22.00
So. Afr., 49-51%	20.00-21.00
Indian, 48-50%	nominal

Refractories □ □

FIRE CLAY BRICK

per 1000 f.o.b. Works

First Quality

Pa., Ohio, Ill., Ky., Md., Ga., Mo.	$45.00
Alabama	48.00

Second Quality

Pa., Ohio, Ill., Ky., Md., Mo., Ga., Ala.	40.00

MALLEABLE BUNG BRICK

All bases	50.00

SILICA BRICK

Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	55.00

MAGNESITE BRICK

Per Net Ton, 9 x 4½ x 2½

Burned	$65.00
Unburned	55.00

CHROME BRICK

Per Net Ton

F.o.b. ship. point	$45.00

MAGNESITE

Dead burned grain, Chester, Pa., Baltimore bases, net	40.00
Domes, Chewelah, Wash., base	22.00

Fluorspar □ □

85 and 5 per cent grade

Washed gravel, duty paid, tide, gross ton	$21.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$14.75-15.00

Ferroalloys □ □

(Prices advance Jan. 1)

(In dollars, except Ferrochrome)

Ferromanganese, 78-82% tidewater, duty pd.	82.00
del. Pitts.	87.24
Spiegeleisen, 19-20%, dom., fur., spot†	27.00
Ferrosilicon, 50%, freight all., c. l.	74.50
Do., less carload	82.50
Do, 75 per cent	120-130.00
Spot, $5 a ton higher.	
Silicomang., 2½ carb.	85.00
2% carbon	90.00
1% carbon	100.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. con. del.	9.50
Do, spot del.	10.00
Ferrotungsten, stand., lb. cont.	1.16- 1.25
Ferrovanadium, 35 to 40%, lb. cont., on analysis	2.60- 2.80
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton., frt., all., lb	7.00
Do, under 1 ton	7.50
Ferrophosphorus, per ton, c. l. 17-19%, Rockdale, Tenn., basis; 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	65.00
Ferromolybdenum, stand, 50-60%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads. Quan. diff. apply.

Nonferrous Mill Products

F.o.b. mill base, cents per lb., except as specified. Copper, brass products based on 8.00c Con., copper

Sheets	
*Yellow brass (high)	13.75
*Copper, hot rolled	15.00
Lead, cut, to jobbers	8.00
Zinc, 100-lb. base	9.00
Tubes and Pipes	
*High yellow brass	16.25
*Seamless copper	16.25
Rods	
*High yellow brass	12.25
*Copper, hot rolled	12.25
Anodes	
*Copper, untrimmed	12.75
Wire	
*Yellow brass (high)	14.25

Old Metals □ □

Deal, buying prices, cents lb.

No. 1 Composition Red Brass	
*New York	4.37½-4.62½
*Chicago	4.50- 5.00
*Cleveland	4.75- 5.25
St. Louis	4.00- 4.25
Heavy Copper and Wire	
*New York	5.87½-6.12½
*Chicago, No. 1	5.87½-6.12½
*Cleveland	5.50- 5.75
St. Louis	5.00
Composition Brass Borings	
New York	4.12½-4.37½
Light Copper	
*New York	5.12½-5.37½
*Chicago	4.62½- 4.75
*Cleveland	5.00- 5.25
St. Louis	4.25
Light Brass	
*Chicago	2.87½-3.12½
*Cleveland	2.75- 3.25
Lead	
New York	3.00- 3.25
*Cleveland	2.75- 3.25
Chicago	2.87½-3.12½
St. Louis	2.75- 3.00
Zinc	
New York	2.25- 2.50
Cleveland	2.25- 2.50
Chicago	2.00- 2.25
St. Louis	2.25- 2.50
Aluminum	
*Clips, soft, Cleve.	13.00-14.00
*Borings, Cleveland	5.50- 6.00
*Mixed, cast Cleve.	8.25- 8.50
Mixed, cast, St. L.	7.25- 7.75

Secondary Metals □

Brass ingot, 85-5-5-5	8.25
Remelt Al., No. 12	12.00-12.50

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	9.00- 9.50
Boston, dealers	5.50- 6.00
Buffalo, No. 1	9.25-10.00
Buffalo, No. 2	8.00- 8.50
Chicago	9.00-10.00
Cleveland, No. 1	9.00- 9.50
Cleveland, No. 2	8.50- 9.00
Detroit, No. 1	8.00- 8.50
Detroit, No. 2	6.75- 7.25
Eastern Pa.	11.00
Eastern Pa., No. 2	8.50- 9.00
Federal, Ill.	7.75- 8.25
Granite City, Ill.	8.25- 8.75
N. Y., deal. R. R.	8.00
N. Y., deal. No. 2	7.00
Pittsburgh, No. 1	12.50-13.00
St. Louis, No. 1 del	9.25- 9.75
Valleys, No. 1	12.50

COMPRESSED SHEETS

Buffalo, dealers	8.00- 8.50
Chicago, factory	7.00- 7.50
Cleveland	9.00- 9.50
Detroit	8.00- 8.50
E. Pa., new mat.	9.50-10.50
Pittsburgh	12.25-12.75
Valleys	12.00

BUNDLED SHEETS

Buffalo	5.50- 6.00
Cincinnati, del.	5.50- 6.00
Cleveland	6.25- 6.75
Pittsburgh	10.75-11.25
St. Louis	5.00- 5.50

SHEET CLIPPINGS LOOSE

Chicago	5.00- 5.25
Cincinnati	4.50- 5.00
Detroit	5.50- 6.00
St. Louis	4.50- 5.00

STEEL RAILS, SHORT

Birmingham	11.00-11.50
Boston, dealers	5.00- 5.25
Buffalo	12.00-12.50
Chicago (3 ft.)	10.50-11.00
Chicago (2 ft.)	11.50-12.00
Cincinnati, del.	11.00-11.50
Detroit	9.00- 9.50
Pitts., (open-hearth, 3 ft. and less	14.00-14.50
St. Louis	12.00-12.50

STOVE PLATE

Birmingham	7.00- 7.50
Boston, dealers	4.50- 4.75
Buffalo	9.00- 9.50
Chicago, net	6.50- 7.00
Cincinnati, dealers	6.00- 6.50
Detroit, net	4.50- 5.00
Eastern Pa.	8.50- 9.00
N. Y., deal., fdry	5.00- 5.50
St. Louis	6.50- 7.00

COUPLERS, SPRINGS

Buffalo	11.50-12.00
Chicago, springs	10.50-11.00
Eastern Pa.	13.00-13.50
Pittsburgh	14.00-14.50
St. Louis	10.00-10.50

ANGLE BARS—STEEL

Chicago	10.00-10.50
St. Louis	9.50-10.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	11.50-12.50
Cleveland, billet, bloom crops	12.50-13.50
Eastern Pa. crops	14.00-14.50
Pittsburgh, billet, bloom crops	16.00-16.50
Pittsburgh, sheet bar crops	14.00-14.50

FROGS, SWITCHES

Chicago	9.00- 9.50
St. Louis	9.50-10.00

SHOVELING STEEL

Chicago	9.00-10.00
St. Louis	7.75- 8.25

RAILROAD WROUGHT

Birmingham	7.00- 8.00
Boston, dealers	2.00- 2.50
Buffalo, No. 1	7.00- 8.00
Buffalo, No. 2	9.50-10.00
Chicago, No. 1, net	7.50- 8.00
Chicago, No. 2	9.00-10.00
Cincinnati, No. 2	8.00- 8.50
Eastern Pa.	11.50-12.00
N. Y., No. 1 deal	7.00- 7.50
Pittsburgh, No. 1	12.50-13.00
St. Louis, No. 1	6.00- 6.50
St. Louis, No. 2	8.25- 8.75

SPECIFICATION PIPE

Boston	4.25- 4.50
Eastern Pa.	9.50
New York, dealers	4.75- 5.25

BUSHELING

Buffalo, No. 1	8.00- 8.50
Chicago, No. 1	7.25- 7.75
Cinci., No. 1 deal	5.75- 6.25
Cincinnati, No. 2	2.50- 3.00
Cleveland, No. 2	7.00- 7.50
Detroit, No. 1 new	6.75- 7.25
St. Louis, No. 1	6.50- 7.00
Valleys, new No. 1	11.00-11.50

MACHINE TURNINGS

Birmingham	3.50- 4.50
Boston, dealers	2.00- 2.25
Buffalo	6.25- 6.75
Chicago	5.00- 5.50
Cincinnati, dealers	4.50- 5.00
Cleveland	7.00- 7.50
Detroit	5.75- 6.25
Eastern Pa.	6.50- 7.00
New York, dealers	2.50- 3.00
Pittsburgh	8.50- 9.00
St. Louis	4.25- 4.75
Valleys	7.50- 8.00

BORINGS AND TURNINGS
For Blast Furnace Use

Boston, dealers	1.75- 2.00
Buffalo	7.00- 7.50
Cincinnati, dealers	4.50- 5.00
Cleveland	7.00- 7.50
Detroit	6.00- 6.50
Eastern Pa.	6.00- 6.50
New York, dealers	2.00- 2.50
Pittsburgh	7.50- 8.00

CAST IRON BORINGS

Birming., plain	4.00- 4.50
Boston, chemical	8.50- 9.00
Boston, dealers	3.25- 3.50
Buffalo	7.00- 7.50
Chicago	5.50- 6.00
Cincinnati, dealers	4.50- 5.00
Cleveland	7.00- 7.50
Detroit	6.00- 6.50
E. Pa., chemical	12.00-15.00
New York, dealers	3.00
Pittsburgh	7.25- 7.75
St. Louis	4.00- 4.50

PIPE AND FLUES

Cincinnati, dealers	4.00- 4.50

RAILROAD GRATE BARS

Buffalo	5.00- 5.50
Chicago, net	6.50- 7.00
Cincinnati	4.75- 5.25
Eastern Pa.	7.50- 8.00
New York, dealers	4.25- 4.50
St. Louis	5.50- 6.00

FORGE FLASHINGS

Boston, dealers	3.75- 4.00
Buffalo	8.00- 8.50
Cleve., over 10-in.	8.50- 9.00
Detroit	6.25- 6.75

FORGE SCRAP

Boston, dealers	3.75- 4.00
Chicago, heavy	10.00-10.50
Eastern Pa.	10.00-10.50

ARCH BARS, TRANSOMS

Chicago, net	6.50- 7.00
St. Louis	9.00- 9.50

AXLE TURNINGS

Boston, dealers	3.50- 3.75
Buffalo	7.50- 8.00
Chicago, elec. fur	8.00- 8.50
Cleveland	9.00- 9.50
Eastern Pa.	10.00
St. Louis	5.00- 5.50

STEEL CAR AXLES

Birmingham	11.00-11.50
Boston, ship. point	8.00- 8.50
Buffalo	10.00-11.00
Chicago, net	10.00-10.50
Eastern Pa.	14.00
St. Louis	11.00-11.50

SHAFTING

Boston, ship. point	9.00- 9.50
Eastern Pa.	15.00
New York, dealers	9.50-10.00
St. Louis	9.00- 9.50

CAR WHEELS

Birmingham, iron	8.00- 9.00
Boston, iron deal	6.00- 6.50
Buffalo, iron	9.00- 9.50
Buffalo, steel	11.00-11.50
Chicago, iron	9.50-10.00
Chi., rolled steel	10.00-10.50
Cincinnati, iron	8.00- 8.50
Eastern Pa., iron	11.00-11.50
Eastern Pa., steel	13.00-13.50
Pittsburgh, iron	11.00-11.50
Pittsburgh, steel	14.00-14.50
St. Louis, iron	8.00- 8.50
St. Louis, steel	9.50-10.00

NO. 1 CAST SCRAP

Birmingham	9.00-10.00
Boston, No. 2	5.50- 5.75
Boston, tex. con	10.25-10.50
Buffalo, cupola	10.00-10.50
Buffalo, mach.	10.50-11.00
Chicago, agri. net	7.00- 7.50
Chicago, mach. net	8.50- 9.00
Chicago, railroad net	7.50- 8.00
Cinci., mach. cup	8.00- 8.50
Cleveland, cupola	9.00- 9.50
Detroit, net	7.50- 8.00
Eastern Pa., cupola	11.50-12.50
N. Y., cup. deal	6.00- 6.50
N. Y., del. local foundries	9.00- 9.50
Pittsburgh, cupola	12.50-13.00
San Francisco, del.	13.50-14.00
Seattle	4.50- 6.50
St. Louis, No. 1	8.00- 8.50
St. L., No. 1 mach.	8.50- 9.00

HEAVY CAST

Boston, del.	5.50- 6.00
Buffalo, break.	7.50- 8.00
Cleveland, break	6.75- 7.00
Detroit, break	6.00- 6.50
Detroit, auto net	8.75- 9.25
Eastern Pa.	11.00
N. Y., No. 1, deal	7.00- 7.25
N. Y., break. deal	6.75- 7.25
Pittsburgh	11.50-12.00

MALLEABLE

Boston, consum	12.00-12.25
Buffalo	10.00-11.00
Chicago, R. R.	9.50-10.00
Cinci., agri. del	8.00- 8.50
Cinci., R. R. del	8.50- 9.00
Cleveland, rail	11.00-11.50
Detroit, auto	6.50- 7.00
St. Louis, R. R.	8.50- 9.00
Eastern Pa., R. R.	11.50-12.50

RAILS FOR ROLLING
5 feet and over

Birmingham	10.00-11.00
Boston, dealers	7.00- 7.25
Buffalo	9.00- 9.50
Chicago	10.00-10.50
Eastern Pa.	12.50
New York, dealer	6.50- 7.00
St. Louis	10.00-10.50

LOCOMOTIVE TIRES

Chicago (cut)	10.00-10.50
St. L., No. 1	8.00- 8.50

LOW PHOS. PUNCHINGS

Buffalo	11.00-11.50
Chicago	11.50-12.00
Eastern Pa.	12.50-13.50
Pittsburgh	14.00-14.50

Nonferrous Metal Prices of the Week

Spot unless otherwise specified. Cents per pound

	Copper: Electro., del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin New York: Spot	Straits Tin New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 98-99%	Antimony Spot, N. Y.	Ingot Nickel
Dec. 16	8.12½	8.25	7.87½	53.37½	53.97½	4.15	4.05	4.50	•22.90	7.12½	35.00
Dec. 18	8.25	8.37½	8.00	53.25	53.85	4.15	4.05	4.50	•22.90	7.12½	35.00
Dec. 19	8.37½	8.50	8.12½	53.12½	53.72½	4.15	4.05	4.50	•22.90	7.12½	35.00
Dec. 20	8.37½	8.50	8.12½	52.60	53.20	4.15	4.05	4.45	•22.90	7.12½	35.00
Dec. 21	8.25	8.37½	8.00	52.30	52.85	4.15	4.05	4.45	•22.90	7.12½	35.00
Dec. 22	8.25	8.37½	8.00	52.75	53.30	4.15	4.05	4.45	•22.90	7.25	35.00

•Nominal quotation. **Market range 19.90c to 22.90c.**

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	□
Baltimore*	2.75c
Boston††	2.90c
Buffalo	2.95c
Chattanooga	3.05c
Chicago	2.90c
Cincinnati	3.10c
Cleveland	2.90c
Detroit	2.98½c
Houston	3.00c
Los Angeles	3.40c
New Orleans	3.00c
New York‡(d)	3.17c
Pittsburgh	2.85c
Philadelphia*	2.75c
San Francisco	3.55c
Seattle	3.40c
St. Louis	3.14c
St. Paul	3.00c
Tulsa	3.25c

IRON BARS	□
Portland	3.40c
San Fran.	3.55c
Baltimore*	2.75c
Baltimore* ..	2.60c
Chattanooga	3.05c
Chicago	2.75c
Cincinnati	3.10c
Detroit	2.98½c
New York‡(d)	3.10c
Philadelphia*	2.75c
St. Louis	3.14c
Tulsa	3.25c

REINFORC. BARS	□
Boston	2.75c-3.25c
Buffalo	1.95c
Chattanooga	3.05c
Chicago	1.95c-2.10c
Cincinnati	3.10c
Cleveland	2.22½c
Houston	3.00c
Los Ang., cl.	3.10c
New Orleans	3.00c
New York	3.17c
Philadelphia	2.62½c
Pitts., plain	3.00c
Pitts., twisted sqs.	3.12½c
Seattle	3.50c
St. Louis	3.29c
Tulsa	3.25c
Young	2.30c-2.60c

SHAPES	□
Baltimore*	2.60c
Boston††	3.07c
Buffalo	3.20c
Chattanooga	3.30c
Chicago	3.10c
Cincinnati	3.30c
Cleveland	3.21c
Detroit	3.30c
Houston	3.00c
Los Angeles	3.40c
New Orleans	3.50c
New York(d)	3.27c
Philadelphia*	2.75c
Pittsburgh	3.05c
Portland	3.40c
San Francisco	3.50c
Seattle	3.40c
St. Louis	3.34c
St. Paul	3.25c
Tulsa	3.50c

PLATES	□
Baltimore*	2.75c
Boston††	3.08c
Buffalo	3.20c
Chattanooga	3.30c
Chicago	3.10c
Cincinnati	3.30c
Cleveland, ¼ in. and thicker	3.21c
Cleve., ⅜-in.	3.20c
Detroit	3.30c
Det., ⅜-in.	3.10c
Houston	3.00c
Los Angeles	3.40c
New Orleans	3.50c
New York(d)	3.30c
Philadelphia*	2.75c
Phila. floor	4.35c
Pittsburgh	3.05c
Portland	3.40c
San Fran.	3.50c
Seattle	3.40c
St. Louis	3.34c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE	□
Baltimore*	2.95c
Boston††	2.90c
Buffalo	3.10c
Chattanooga	3.50c
Chicago	2.95c
Cincinnati	3.10c
Cleveland	3.01c
Det., 8-10 ga.	3.03½c
Houston	3.60c
Los Angeles	3.65c
New Orleans	3.50c
New York	3.17c
Portland	3.65c
Philadelphia*	2.95c
Pittsburgh	2.85c
San Fran.	3.75c
Seattle	3.65c
St. Louis	3.19c-3.36c
St. Paul	3.45c
Tulsa	3.70c

NO. 24 BLACK	□
Baltimore*†	3.50c
Boston††	3.75c
Buffalo	3.25c
Chattanooga	4.00c
Chicago	3.70c
Cincinnati	3.85c
Cleveland	3.76c
Detroit	3.78½c
Los Angeles	4.15c
New York	3.65c
Philadelphia*†	3.40c
Pittsburgh	3.35c
Portland	4.25c
San Fran.	4.25c
Seattle	4.25c
St. Louis	3.94c
St. Paul	3.695c
Tulsa	4.75c

NO. 24 GAL. SHEETS	□
Baltimore*†...	3.75c
Buffalo	4.00c
Boston	4.60c
Chattanooga	4.25c
Chicago	4.20c-4.30c
Cincinnati	4.45c
Cleveland	4.36c
Detroit	4.45c
Houston	3.57c
Los Angeles	4.75c
New Orleans	4.35c
New York	4.25c
Pitts.**	3.90c-4.20c
Portland	4.85c
San Fran.	4.85c
Seattle	4.85c
St. Louis	4.54c
St. Paul	4.19c
Tulsa	5.10c
Phila.*†	4.00c

BANDS	□
Baltimore	3.05c
Boston††	3.15c
Buffalo	3.30c
Chattanooga	3.25c
Chicago	3.20c
Cincinnati	3.35c
Cleveland	3.26c
Detroit, ⅜-in. and lighter	3.28½c
Houston	3.25c
Los Angeles	3.80c
New Orleans	3.20c
New York(d)	3.42c
Philadelphia	3.05c
Pittsburgh	3.10c
Portland	3.90c
San Fran.	3.15c
Seattle	3.90c
St. Paul	3.20c
Tulsa	3.45c
St. Louis	3.44c

HOOPS	□
Baltimore	2.80c
Boston	4.15c
Buffalo	3.55c
Chicago	3.20c
Cincinnati	3.35c
Det., No. 14 and lighter	3.28½c
New York	3.42c
Philadelphia	3.30c
Pittsburgh	3.75c
Seattle	5.40c
St. Paul	3.75c

COLD FIN. STEEL	□
Baltimore(c)	3.56c
Boston	3.83c-4.33c
Buffalo	3.25c
Chattanooga*	3.90c
Chicago	3.35c
Cincinnati	3.55c
Cleveland	3.25c
Detroit	3.40c
Los Ang. (f)	5.95c
New Orleans	4.25c
New York	3.92c-4.42c
Philadelphia	3.58c
Pittsburgh	3.20c
Portland (f)	4.75c
San Fran. (f)	5.95c
Seattle (f)	4.75c
St. Paul	3.20c
St. Louis	3.44c
Tulsa	4.65c

COLD ROLL. STRIP	□
Boston, 0.100-in., 500 lb. lots	5.20c
Buffalo	5.25c
Chicago (b)	5.65c
Cincinnati	5.80c
Cleveland (b)	5.55c
Detroit	5.40c
Philadelphia	4.55c
New York	4.55c
St. Louis	5.74c

(b) Net base, straightening, cutting, boxing, 1 ton or more.

(c) Plus mill, size and quantity extras.

(d) Minus quant. diff.

(e) New mill classif.

(f) Rounds only.

‡Domestic bars.

*Plus quan. extras.

**Under 25 bundles.

*†50 or more bundles.

†New extras apply.

††Base 40,000 lbs., extras on less.

Prices at Detroit, Cleveland, Chicago, Pittsburgh, Cincinnati, Chattanooga, NewYork, Boston, St. Louis on heavier lines are subject to new quantity differentials:

399 pounds and less, up 50 cents; 400 to 9999 pounds, base; 10,000 to 19,999 pounds, 15 cents under; 20,000 to 39,999 pounds, 25 cents under; 40,000 pounds and over, 35 cents under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Dec. 21

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports		Continental Channel or North Sea ports, metric tons Gold parity, $4.8665	
PIG IRON	£ s d		£ s d	£ s d
Foundry, 2.50-3.00 Silicon	$14.86	2 18 6	$8.88	1 16 6
Basic bessemer	13.72	2 14 0*	7.30	1 10 0
Hematite, Phos. .03-.05	15.24	3 0 0	....	.....
SEMIFINISHED STEEL				
Billets	$27.94	5 10 0	$11.44	2 7 0
Wire rods, No. 5 gage	39.62	7 16 0	21.99	4 10 0
FINISHED STEEL				
Standard rails	$39.37	7 15 0	$26.77	5 10 0
Merchant bars	1.56c	6 17 6	.69c	3 2 6
Structural shapes	1.67c	7 7 6	.63c	2 17 6
Plates, †¼ in. or 5 mm.	1.82c	8 0 0	.89c	4 1 0
Sheets, black, 24 gage or 0.5 mm.	2.10c	9 5 0	1.27c	5 15 0
Sheets, gal., 24 gage, corr.	2.55c	11 5 0	1.60c to 1.76c	7 5 0 to 8 0 0
Bands and strips	1.82c	8 0 0	.85c	3 17 6
Plain wire, base	2.10c	9 5 0	1.18c	5 7 6
Galvanized wire, base	2.50c	11 0 0	1.38c to 1.40c	6 5 6 to 6 7 6
Wire nails, base	2.72c	12 0 0	1.27c	5 15 0
Tin plate, box 108 lbs.	$ 4.19	0 16 6	.....	.....

British ferromanganese $82 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$15.88	3 2 6(a)	$13.07	215	$13.18	305	$23.34	63
Basic bessemer pig iron	16.51	3 5 0(a)*	11.25	185	12.53	290	25.75	69.50
Furnace coke	3.81	0 15 0	7.30	120	4.75	110	7.13	19.25
Billets	27.94	5 10 0	24.62	405	19.01	440	35.75	96.50
Standard rails	1.87c	8 5 0	1.96c	700	2.20c	1,100	2.22c	132
Merchant bars	1.73c	7 12 6	1.57c	560	1.07c	535	1.85c	110
Structural shapes	1.99c	8 15 0	1.54c	550	1.07c	535	1.81c	107.50
Plates, †¼-in. or 5 mm.	1.93c	8 10 0	1.90c	680	1.35c	675	2.13c	127
Sheets, black	2.33c	10 5 0§	2.38c	850‡	1.50c	750‡	2.42c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.89c	12 15 0	4.06c	1,450	3.00c	1,500	6.22c	370
Plain wire	2.10c	9 5 0	3.16c	1,130	2.20c	1,100	2.97c	177
Bands and strips	2.38c	10 10 0	1.82c	650	1.35c	675	2.13c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel. a del. Middlesbrough. b Since January.

Bars

Bar Prices, Page 30

Soft steel bar specifications and shipments are far in excess of incoming business, which is increasing slightly, but which still is in small volume. Shipments to practically all types of consumers are heavier as a result of the approaching expiration of fourth quarter contracts.

Automotive demand at Chicago still is slow and larger orders are not anticipated for a few weeks, due to delays in increasing operations and to the fact that some tonnage received previously remains to be consumed.

Merchant steel bar demand at Pittsburgh is notably lacking but shipments continue strong. The high rate of shipments will continue over this week and next, so that buyers' fourth quarter balances will be entirely shipped by Dec. 31.

Carbon steel bars are based on 1.75c, Pittsburgh, from Jan. 1.

Specifications for commercial steel bars, particularly good over the past fortnight, are now tapering at New York, as shipments must be finished by Dec. 31. Contracting for next quarter lags, with the present price of 1.75c, Pittsburgh, extended.

At Cleveland last-minute specifications were heavy and in some instances mills had to cancel, being unable to ship by Jan. 1. Some new orders for prompt shipment also were held over. Producers generally report 50 per cent or more of their general trade covered by contracts for first quarter.

Commercial steel bar specifications resulted in heavier shipments to New England as most consumers with contracts took in moderate stocks against the first quarter advance.

Contracting for soft steel bars in the Philadelphia district is proceeding slowly for first quarter, with a marked diminution in shipments expected in January.

Plates

Plate Prices, Page 30

Although orders for fabricated plate products continue light, inquiries are more numerous and first quarter prospects are more favorable. Tank inquiries are well diversified, including industrial as well as municipal work.

A few small brewery projects are pending at Chicago and 250 tons have been placed for tanks for a Peoria, Ill., distillery. Oil companies also are more active in planning improvement work and better business is anticipated from this source early next year.

Although about 4500 tons of plates and other car materials have been awarded by the Pennsylvania railroad for 500 new cars to be built at Altoona, Pa., Pittsburgh plate mills sharing in the order have not yet received releases. Plates are quoted firmly at 1.70c, Pittsburgh, on new business and also for first quarter, but there has been little commitment on contracts for first quarter.

Cleveland plate mills operated on full schedule during the week to produce material to fill miscellaneous specifications. A flood of specifications were received by most mill interests, and makers said they would be unable to get out all the tonnage required, due to the fact many consumers waited until last ten days of the month before specifying.

Platemakers in eastern Pennsylvania are interested in distribution of material for two tankers for the Standard Vacuum Transportation Co., New York, involving 5700 tons of plates, shapes and bars, on which New York Shipbuilding Co., Camden, N. J., is low bidder. Pusey & Jones, Wilmington, Del., has distributed 1400 tons of plates, shapes and bars among at least seven mills.

Ship work is the feature of the plate market in the New York area. United Dry Docks Inc., New York, will start in January on a $255,000 rebunkering and repair contract on three vessels for the Southern Pacific Steamship Co. Brewer Dry Dock Co. Inc., New York, has been awarded a $31,000 contract for repairing the OHIOAN. Atlantic Refining Co. Philadelphia, has awarded a 190-foot tanker to the Sun Shipbuilding & Dry Dock Co., Chester, Pa. United Dry Docks Inc. will start construction at once on three self-propelled oil barges for Standard Vacuum Transportation Co., New York.

Contracts Placed

1400 tons, including bars and shapes, divided among seven suppliers by Pusey & Jones, Wilmington, Del.

250 tons, tanks, Hiram Walker distillery, Peoria, Ill., to Graver Tank & Mfg. Corp., East Chicago, Ind.

200 tons, 18-8 steel, bureau of supplies and accounts, navy department, Washington, to Crucible Steel Co. of America, Pittsburgh.

Contracts Pending

5700 tons, including bars and shapes, two tankers for Standard Socony Transportation Co., New York; New York Shipbuilding Co., Camden, N. J., low.

5280 tons, armor plate for navy; bids Jan. 3.

400 tons, two 500,000-gallon water storage tanks, St. Johnsbury, Vt.

300 tons, two 1,000,000-gallon tanks for Santa Cruz, Calif.; Pittsburgh-Des Moines Steel Co., Pittsburgh, low.

250 tons, tanks for fuel oil facilities, Pearl Harbor, T. H.; Industrial Piping & Engineering Co., Baltimore, low.

200 tons, water tank, Belle Glade, Fla.; bids Jan. 10.

175 tons, 500,000-gallon elevated water tank, Two Rivers, Wis., federal loan approved.

165 tons, plates and shapes, 400,000-gallon elevated storage water tank for Galion, O.; McClintic-Marshall Corp., Bethlehem, Pa., low, but all bids rejected, and new bids called for Dec. 30.

115 tons, 300,000-gallon elevated water tank, Louisville, O., federal loan approved.

100 tons, 250,000-gallon water tank, Kaukauna, Wis., federal loan approved.

Unstated tonnage, 200,000-gallon elevated water tank, Anchorage, Ky.; Henry Bickel Co., Louisville, Ky., general contractor.

Unstated tonnage, 150,000-gallon elevated water tank, Rosenberg, Texas.

Sheets

Sheet Prices, Page 30

Sheet production in the Pittsburgh district is easing off and new orders there are infrequent. Only slight interest is noted in the first quarter. Base prices at Pittsburgh on black sheets at 2.25c, galvanized sheets at 2.85c, and blue annealed sheets at 1.75c, are firm. Occasional sales test the autobody sheet price of 2.75c, base, for No. 20 gage.

At Chicago sheet demand has turned upward and shipments are heavier. While some specifications are applied against old contracts, new business is being received for prompt shipment.

Some of the northern Ohio sheet mills will not resume production after the Christmas holiday until Dec. 27.

During the past week some moderate size spot orders were received at Cleveland from automotive consumers, but few contracts have been placed for the first quarter. Sheet makers now are figuring on a large tonnage for freight cars for the Erie, Nickel Plate, and Chesapeake & Ohio railroads, on which bids are asked.

Although sheet specifications in the New York district are slow, they are larger than a year ago, notwithstanding the desire of consumers to keep inventories at the lowest possible level. Many in the trade here look for an advance in prices the latter part of January.

This week is likely to see sheet mill operations in eastern Pennsylvania at the lowest point in some time. From Philadelphia it is reported sellers may file advances for second quarter in January.

Shapes

Structural Shape Prices, Page 30

Shape awards for the week were substantially above the weekly average for 1933, and some additional large tonnages came out for figures.

Bids will be opened Jan. 15 on 15,000 tons of shapes for the first section of the Pennsylvania's high speed line over the Delaware river bridge at Philadelphia.

Bids will be taken Jan. 3 on the superstructure for two Cape Cod highway bridges, requiring 12,000 tons.

At Chicago awards of 7500 tons are heavier than the average of recent weeks, including more than 7000 tons for river locks at Genoa and Winona, Wis. Missouri Pacific railroad has placed 1050 tons for a bridge, while practically all other orders are for public jobs.

Inquiries and pending work in the Middle West are large, about 25,000 tons of shapes and piling being included in projects on which bids either have been taken or will close soon. This list includes four locks requiring more than 16,000 tons. A filtration plant at Milwaukee requires 3800 tons of shapes and piling in addition to about 4000 tons of reinforcing bars.

At Cleveland, 2265 tons of sheet piling is active for government projects. Through a Cleveland general contractor 500 tons of shapes and bars have been awarded for a bridge in Greene county, Pennsylvania.

Plain structural shapes are unchanged at 1.70c base, Pittsburgh, with this figure becoming uniform on all shipments after Jan. 1. Steel piling at 2.00c, Pittsburgh and 2.10c, Buffalo and Chicago, is firm and unchanged.

At New York plain material was more active as fabricating shops ordered out some stock against contract at old prices before the 1.80c, Bethlehem, Pa., becomes general on all business.

Independent fabricators are considerably agitated over a proposal now under consideration with official sources to eliminate the fabricated-in-transit clause in railroad freight rates on bars, plates and shapes. A public hearing is to be held at Chicago, Jan. 24. Further details are available in this issue of STEEL, page 10.

Contracts Placed

3600 tons, lock No. 8, Genoa, Wis.; 2500 tons, piling, to Inland Steel Co., Chicago; 1100 tons, shapes, to R. C. Mahon Co., Detroit. Jutton-Kelly Construction Co., Detroit, general contractor.

2500 tons, piling, lock No. 5-A, Winona, Wis., to Inland Steel Co., Chicago.

2100 tons, Cape Fear river dam, North Carolina: 900 tons of new piling to Inland Steel Co., Chicago; 1200 tons of used piling to Brown & Sites, New York.

1350 tons, Rockland county hospital buildings, Orangeburg, N. Y., to Bethlehem Fabricators Inc., Bethlehem, Pa.; Amsterdam Building Corp., New York, general contractor.

1050 tons, bridge, Missouri Pacific railroad, Snow Lake, Ark., to Stupp Bros. Bridge & Iron Co., St. Louis.

1025 tons, bridge spans, Missouri, to Stupp Bros. Bridge & Iron Co., St. Louis.

1000 tons, shaft, Manhattan-Weehawken tunnel; bids Feb. 6.

815 tons, building, East River Savings Bank, Fulton and Church streets, New York, to Post & McCord Inc., New York; through A. L. Hatridge Co.

640 tons, building, Fort Bragg, North Carolina, to Carolina Steel & Iron Co., Greensboro, N. C. Tonnage revised from 350-ton award mentioned in STEEL, Dec. 18.

500 tons, bridge, Greene county, Pennsylvania, to Fort Pitt Bridge Works, Pittsburgh; 50 tons of concrete bars included.

435 tons, 450 conveying racks, plant, Rossford, O., to Lackawanna Steel Construction Corp., Buffalo.

430 tons, double hangar, Fort Bragg, North Carolina, to Dietrich Bros., Baltimore.

400 tons, bridge, Pryde, S. C., for Seaboard Airline, to McClintic-Marshall Corp., Bethlehem, Pa.

400 tons, alterations to incinerators, New York, to Lehigh Structural Steel Co., Allentown, Pa.

400 tons, incinerator alterations, New York, to Leider Structural Steel Co., New York, Lehigh Structural Steel Co., Allentown, Pa., fabricating; Woodcrest Construction Co., general contractor.

300 tons, bridge, Brookville, Ind., to Midland Structural Steel Co., Cicero, Ill.

270 tons, highway structure, project NRM-341-A, Georgia, to Virginia Bridge & Iron Co., Roanoke, Va.

265 tons, forms, levee work, Greenville, Miss., to Virginia Bridge & Iron Co., Roanoke, Va.; Simons-Mayrant Co., Charleston, S. C., general contractor.

230 tons, highway structure, project NRH-30, Georgia, to American Bridge Co., Pittsburgh.

210 tons, seaplane hangar, United States coast guard, Biloxi, Miss., to Virginia Bridge & Iron Co., Roanoke, Va.; B. L. Knost, Pass Christian, Miss., general contractor.

200 tons, state bridge, West Seneca, N. Y., to Lackawanna Steel Construction Corp., Buffalo.

200 tons, state bridge, Rc-3505, Erie county, New York, to Lackawanna Steel Construction Corp., Buffalo.

200 tons, track shed, Eastern States Milling Corp., Tonawanda, N. Y., to Buffalo Structural Steel Co., Buffalo.

150 tons, army grain warehouse, Fort Lewis, Washington, to Isaacson Iron Works, Seattle.

140 tons, infirmary, National Home for Lepers, Carville, La., to Chester Iron & Foundry Co., St. Louis; Murch Bros., Construction Co., St. Louis, general contractor.

135 tons, beam spans, Henry county, Iowa, to Paxton & Vierling Iron Works, Omaha.

130 tons, highway bridge, Gum creek, near Alamo, Ga., to American Bridge Co., Pittsburgh; Beckham-Lawler Construction Co., Perry, Ga., general contractor.

125 tons, bridge, Mt. Pleasant, Iowa, to Vierling Steel Works, Chicago.

115 tons, beam span, Sioux, Iowa, to an unidentified Iowa state fabricator.

100 tons, bridge, Red Key, Ind., to McClintic-Marshall Corp., Bethlehem, Pa.

Unstated tonnage, administration building, Fort Knox, Tenn., to Jones & Laughlin Steel Corp., Pittsburgh; A. Bornstein, Louisville, Ky., general contractor.

Shape Awards Compared

	Tons
Week ended Dec. 23	18,065
Week ended Dec. 16	35,170
Week ended Dec. 9	12,568
This week in 1932	70,663
Weekly average for 1932	17,429
Weekly average, 1933	15,452
Weekly average, Nov.	16,020
Total to date, 1932	906,347
Total to date, 1933	788,076

Contracts Pending

15,000 tons, first section, high-speed railroad over Delaware river bridge, Phildelphia; bids Jan. 15.

12,000 tons, superstructures two highway bridges, Cape Cod canal, Bourne-Sagamore, Mass.; bids Jan. 3, to United States engineer, Boston.

6100 tons, lock No. 26, Alton, Ill.; John Griffith & Sons Co., Chicago, low on general contract at $3,194,702.

3800 tons, shapes and piling, filtration plant, Milwaukee; bids soon.

3600 tons, shapes and piling, Mississippi river lock No. 11, Dubuque, Iowa; bids Jan. 11 at Rock Island, Ill.

3600 tons, shapes and piling, lock No. 9, Lynxville, Wis.; Walter W. McGee Co., St. Paul, low on general contract.

3300 tons, shapes and piling, lock No. 18, Burlington, Iowa; bids Jan. 3 at Rock Island, Ill.

2000 tons, buildings, Brentwood state hospital, New York; bids Jan. 10.

1750 tons, sheet piling; breakwater at Huron, O.; bids Jan. 10 to United States engineers, Cleveland.

1500 to 2500 tons, causeway, Mare Island, Calif.; Barrett & Hilp, San Francisco, low on general contract.

1350 tons, Missouri highway bridges.

1300 tons, state bridge, St. Albans, W. Va.; bids Dec. 28.

1200 tons, traffic way, Seventh street viaduct, Kansas City, Mo.

1200 tons, Standard Brands of California contract to Barrett & Hilp, San eral contract to Barrett & Hilp, San Francisco.

1125 tons, including 200 tons piling, Euclid avenue viaduct, Des Moines, Iowa.

1050 tons, Ruby street bridge, Joliet, Ill.; Milwaukee Bridge Co., Milwaukee, low.

1000 tons, New York state highway

bridges.
750 tons, seaplane hangar, Coco Solo, C. Z., specification 7351; bids Jan. 17.
515 tons, sheet piling; bids Dec. 28 to United States coast guard, Cleveland.
500 tons, substructure for library of Congress annex, Washington.
400 tons, hangars at Albrook Field, Canal Zone; bids Dec. 26.
400 tons, superstructure, pier No. 3, Fort Mason, California; bids opened.
350 tons, state bridge, North Adams, Mass.; bids in.
300 tons, turbine supports, Richmond street, powerhouse of United Gas & Improvement Co., Philadelphia.
290 tons, state highway bridge, Liberty, N. Y.
275 tons, bridge, Miami county, Ohio; bids to state highway commission, Columbus, Dec. 29. Project also takes 82 tons of concrete bars.
260 tons, state highway bridge, Buena Vista, Va.; bids in.
200 tons, bridge, Horseheads, N. Y., near Elmira, N. Y., for Erie railroad.
179 tons, state bridge over Santa Ana river, Orange county, California, for state; general contract to Franklin B. Gridley, Pasadena, Calif.
170 tons, state highway bridge, Benson borough, Pennsylvania.
140 tons, state bridge, Stoughton, Mass.; bids in.
126 tons, two state bridges over Tongue river, Wyoming; bids Dec. 19.
110 tons, switch racks for Los Angeles, specification 3250; McClintic-Marshall Corp.; Los Angeles, low.
110 tons, bridge, Lawrence county, Pennsylvania; bids Jan. 5.
106 tons, steel pony truss bridge, Canonsburg borough, Washington county, Pennsylvania; Lackawanna Steel Construction Corp., Buffalo, low at $19,212. Bids of Dec. 15.
100 tons, sheet steel piling, highway work in Ventura county, California; general contract to Silveria & Robbins, Ventura, Calif.

Reinforcing

Reinforcing Bar Prices, Page 31

Additional reinforcing bar orders and inquiries are developing from public works activity. A filtration plant at Milwaukee will take about 4000 tons, while several additional Mississippi river locks are up for bids over the next several weeks.

Little support is provided business by private construction work and prospects in this field for the near future are uncertain.

At New York close to 1000 tons of highway mesh has been placed for state work, a large part of which will be furnished by a Pittsburgh district mill. Pending billet bar requirements are heavier with more public work developing.

The Ohio highway commission is taking bids Dec. 29 on 14 projects requiring a total of 254 tons of bars.

Cut lengths of new billet steel bars continue 1.90c, Pittsburgh, for the remainder of December, and the first quarter. Rail steel bars are 1.75c, Pittsburgh. A proposal is being considered to eliminate the fabricated-in-transit clause to railroad freight rates, which if granted will affect concrete bar fabricators.

Several hundred tons for highway work, including mesh and rerolled material, were placed in New England during the week.

Demand in eastern Pennsylvania has increased, and with the distributors' code now in effect the market there is firm.

Contracts Placed

400 tons, Standard Brands of California building, Oakland, Calif., to Truscon Steel Co., San Francisco.
325 tons, lock No. 5, Quincy, Ill., to Laclede Steel Co., St. Louis.
275 tons, highway, Westchester, county, New York, to Concrete Steel Co., New York; A. W. Banko Inc., Hastings-on-Hudson, N. Y., general contractor.
250 tons, miscellaneous highway work, New York, namely, lettings of Dec. 5 and 8, to American Steel & Wire Co., New York; not included in specific projects named in this column.
225 tons, Highway, Monroe and Genesee counties, New York, to American Steel & Wire Co., New York; Manitou Construction Co., Rochester, N. Y., letting of Dec. 5.
200 tons, highway, Steuben county, New York, to American Steel & Wire Co., New York; J. F. Morgan Co., Olean, N. Y., general contractor; letting of Dec. 8.
187 tons, siphon for metropolitan water district, Los Angeles, to unnamed interest.
150 tons, grade separations, Queens county, New York, to Capitol Steel Co., Brooklyn, N. Y.; through Bersin Engineering Corp.
130 tons, substructure, Ruby street bridge, Joliet, Ill., to Concrete Steel Co., Chicago.
125 tons, Boulder dam, specification 3294-A, to Pacific Coast Steel Corp., San Francisco.
118 tons, state bridges in three counties in Montana, to unnamed interests.
100 tons, wire mesh for Los Angeles county, California, to unnamed interest.
100 tons, headquarters building, Hamilton Field, California, to Pacific Coast Steel Corp., San Francisco.
100 tons, highway, Waterbury, Conn., to American Steel & Wire Co., New York; Altieri Construction Co., Waterbury, general contractor.

Concrete Awards Compared

	Tons
Week ended Dec. 23	2,685
Week ended Dec. 16	12,137
Week ended Dec. 9	2,843
This week in 1932	1,468
Weekly average for 1932	3,920
Weekly average, 1933	3,773
Weekly average, Nov.	3,253
Total to date, 1932	205,543
Total to date, 1933	192,453

Contracts Pending

1000 tons, causeway, Mare Island, Calif.; Barrett & Hilp, San Francisco, low on general contract.
899 tons, lock No. 16, Muscatine, Iowa; Central Engineering Co., Davenport, Iowa, general contractor.
625 tons, hosiery workers' housing project, Philadelphia, Turner Construction Co., Philadelphia, low.
350 tons, government building; Gloucester, N. J.; Thomas Erle & Sons, Philadelphia, awarded general contract.
275 tons, bridges and highways, West Virginia; bids Dec. 28.
269 tons, state bridge over Southern Pacific railroad tracks in Ventura county, California; bids Jan. 3.
254 tons, in 14 road jobs in Ohio, on which highway commission, Columbus, is taking bids Dec. 29. Included are 82 tons for a bridge in Miami county, which also requires 275 tons of shapes.
250 tons, roller crest dam, Montgomery island, Ohio river, near Pittsburgh; Booth & Flinn Co., Pittsburgh, low on general contract.
100 tons, state bridge over Sunset & Glendale boulevards, Los Angeles; bids Jan. 3.
100 tons, bridges and highways, Virginia; bids in Dec. 19.

Pipe

Pipe Prices, Page 31

Year-end pipe business is fairly active, chiefly as a result of federal loans for municipal projects requiring pipe tonnages.

Bids on the large sewage disposal project in Chicago are expected to be asked for within the next 90 days, following approval of a $43,000,000 loan for completion of the work which was suspended over a year ago. A large unstated tonnage will be required for a Milwaukee filtration plant.

Several large orders for oil country goods have been closed recently by Pittsburgh pipe producers, this business having been driven in by the steel code stipulation on completed shipments by Dec. 31. The material is for stock.

Cast pipe continues active in New England, a good part of the business placed in the East originating in this district. Outlook for steel pipe is brighter with a water project planned for the Dorchester district, Boston, which may take about 2000 tons of plates for the pipe. Providence, R. I., has plans for a metropolitan district sewer system which would require 10,000 tons of material, cast iron or steel pipe and bars.

Pipe buying in the New York district continues slow.

Delaware river pipe foundries are

now operating five days a week with good tonnage ahead.

Cast Pipe Placed

2000 tons, 24-inch, Cincinnati, to United States Pipe & Foundry Co., Burlington, N. J., in addition to 1060 tons of 16-inch reported last week.
400 tons, 16-inch, Lawrence, Mass., to Donaldson Iron Works, Emaus, Pa.
300 tons, fittings, Chicago, to Bessemer Foundry & Machine Co., Besemer, Ala.

Cast Pipe Pending

1875 tons, 8 to 16-inch, also 98 tons special sizes, Washington; bid Dec. 29.
300 tons, Rosiclaire, Ill.
110 tons, 6 and 8-inch, Anchorage, Ky.
125 tons, 8-inch, Binghamton, N. Y., bids in.

Railroads

Track Material Prices, Page 31

Interstate commerce commission has approved the following loans to railroads for the purchase of rails and fastenings: Chicago & North Western, $3,461,913 for 65,000 tons rails and 18,000 tons accessories; Pittsburgh & West Virginia, $47,000 for 1000 tons of rails and fastenings; Chicago & Eastern Illinois, $251,300 for 4000 tons of rails and fastenings.

Central of Georgia is inquiring for 200 new coal cars and the New York, New Haven & Hartford has an inquiry pending for repairs and improvements to 900 passenger and 300 multiple-unit electric cars. The New Haven is also about to equip 142 passenger cars with air-conditioning devices.

Applications to the interstate commerce commission have been made by the Lehigh Valley, the Illinois Central and Wabash for authorization of loans from the PWA for purchase of materials and repairs. Lehigh Valley asks authority to issue notes to secure a loan of $2,000,000 for 1000 box, 1000 coal cars and 60 locomotives. Illinois Central asks authority for a loan of $10,000,000 for maintenance, including rails, bridges, bridge and equipment repairs and the Wabash for a loan of $1,489,803 to purchase 10,000 tons of rails and do repair work.

Delaware, Lackawanna & Western has awarded 11,000 tons of rails to Bethlehem Steel Co. and 1000 tons to Carnegie Steel Co. Lehigh & New England has placed 3183 tons of rails with Bethlehem Steel Co. Baltimore & Ohio is seeking a federal loan for itself and affiliated lines, with which to purchase 50,000 tons of rails, 5000 tons for the Reading. Lehigh & Hudson River is inquiring for 1000 tons of rails.

Wheeling & Lake Erie may purchase 4000 to 5000 tons of rails in January. Chicago, Milwaukee, St. Paul & Pacific has received approval of a loan for the purchase of 50,000 tons of rails and the Atchison, Topeka & Santa Fe is expected to close for 35,000 tons shortly.

Detroit United Railways has placed an order for 20,000 steel ties, 1330 tons, with Cleveland Steel Tie Co., Cleveland. This road has recently placed 2700 tons of steel rails with Bethlehem Steel Co.

A change has been made in quantity extras on billet quality light rails. Instead of the minimum of 20-ton lots, the new minimum is 25 tons. Under 25 to 10 ton lots, inclusive, the new quantity extra is $1 per ton; 50 to 10-ton lots, inclusive, $2 per ton; one to five tons, $3; and under one ton, $5. Size extra on 50-60-pound rails has also been changed from a former $5 to a present $4.37½. Rerolling quality rails hold at $31, Pittsburgh.

Rail Orders Placed

Delaware, Lackwanna & Western, 12,000 tons of 131-pound rail, 11,000 tons to Bethlehem Steel Co., Bethlehem, Pa., 1000 tons to Carnegie Steel Co., Pittsburgh.
Lehigh & New England, 3000 tons 130-ton rails, 183 tons, 100-pound rail, to Bethlehem Steel Co., Bethlehem, Pa.

Locomotive Orders Placed

Northern Pacific, ten locomotives, to Baldwin Locomotive Works, Eddystone, Pa., at $122,000 each.

Car Orders Pending

Central of Georgia, 200 coal cars, specifications expected out shortly; government loan granted.
Chesapeake & Ohio, 7800 cars, including 800 box cars, 50 tons; 4500 hoppers, 60 tons; 2500 flat gondolas, 50 tons; bids Jan. 15.
Nickel Plate, 1200 cars, including 500 box cars, 50 tons; 500 low-type gondolas, 50 tons; 175 livestock, 40 tons; 25 allsteel flat cars, 50 tons; bids Jan. 15.

Locomotive Orders Pending

Nickel Plate, 15 freight locomotives, 5 switching locomotives, 20 additional tenders of 19,000 gallons capacity; bids Jan. 15.

Rail Orders Pending

Baltimore & Ohio, 50,000 tons; federal loan sought for requirements of road and subsidiaries, including Reading.
Chicago & North Western, 65,000 tons rails, 18,000 tons fastenings; loan approved.
Chicago & Eastern Illinois, 4000 tons rails and fastenings; loan approved.
Lehigh & Hudson River, 1000 tons; inquiry out.
Pittsburgh & West Virginia, 1000 tons rails, and fastenings; loan approved.
Wheeling & Lake Erie, 4000 to 5000 tons rails; purchase expected in January.

Strip Steel

Strip Prices, Page 31

A number of strip mills in the Philadelphia area are expected to be down this week. Contracting for first quarter is slow.

Interest in hot and cold-rolled strip steel for first quarter is evident and automotive buyers have been in the market recently with specifications for shipment after Jan. 1. Contract buyers in the Pittsburgh district are not anticipating more than their contract requirements.

While strip steel shipments remain fairly active from Chicago mills new business is slow and slightly improved.

December specifications for steel strip to important producers at Cleveland are the best for December in several years. Sales for delivery beyond Jan. 1 also continue to improve, though leading consumers have not contracted for first quarter.

Strip demand in New England is inactive. Some business has developed with automobile partmakers.

Wire

Wire Prices, Page 31

Shipments of wire products to the manufacturing and jobbing trades still are the heaviest in recent months, this being caused by the steel code regulation making shipments on fourth quarter and pre-code agreements compulsory by Dec. 31.

Base prices at Pittsburgh on wire products continue without change, the schedule as of Dec. 1 in effect.

Shipments of wire and wire products are heavy in the Chicago area, due to the coming expiration of old contracts.

Specifications on wire still are brisk at Cleveland. Few contracts have been booked for first quarter. Producers, however, say production will be sustained by the necessity for replacing their stocks, which have been depleted by heavy shipments.

Straight and mixed carloads of wire products now take the base price; pool carloads, or less, take a differential of 10 cents.

Pig Iron

Pig Iron Prices, Page 32

While the holiday season finds spot sales and advance contracting in smaller volume, pig iron shipments continue heavy, with many melters specifying practically all material due them on contracts.

December shipments in the Chicago district may exceed the November movement by 25 per cent. Some fairly large tonnages which had been expected to be canceled now are being taken out. First quarter bookings are increasing rather rapidly, and further gains in automotive requirements and in needs of farm implement manufacturers are seen. Chicago prices are unchanged at $17.50, furnace, for No. 2 foundry and malleable.

Contracting is conspicuously absent in the Pittsburgh region, one reason being the serious inroads made by scrap. Normally a user of basic pig iron, one melter has not contracted for this material in almost a year and a half, using scrap instead. Recent sales have featured some southern iron moving by all-rail to the Pittsburgh district, and some low-phosphorus iron.

Shipments hold in large volume at Cleveland, with spot sales light and only a few contracts closed for first quarter. Prices are unchanged.

Five furnaces continue in blast in the Buffalo district, with shipments proceeding steadily. A boatload of iron is reported to have arrived in Detroit at the holiday week-end.

Steadily improving melt is predicted for the first quarter by Cincinnati observers, but buyers are conservative in placing pig iron contracts. The Columbus, O., furnace of the American Rolling Mill Co. will go in blast Jan. 2, partly to supply needs of the company's Butler, Pa., mills.

Most melters in the New England territory will enter the first quarter with fair stocks as a result of specifying as fully as possible against expiring contracts.

With good railroad equipment buying in sight and cast pipe foundries stepping up operations, prospects for pig iron sales for first quarter are bright, according to advices from Philadelphia.

Only a few first-quarter contracts are reported in the Birmingham, Ala., district. Shipments there are holding steady.

With prices firm and unchanged iron producers at Toronto, Ont., look for improvement early in 1934.

Movement of iron in the St. Louis territory for December is expected to be the largest for that month since 1929. A considerable contract tonnage still is to go forward, many melters having delayed specifying.

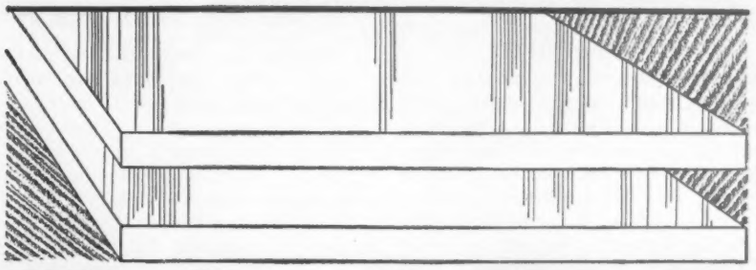
Despite little new contracting, pig iron sellers at New York are experiencing one of the best months of the year, in point of shipments on old contracts.

Scrap

Scrap Prices, Page 33

Pittsburgh—The market has leveled off, and consumer interest being less apparent, has taken an edge off of the situation the past week in iron and steel scrap. Although the market is inherently strong, one mill here was able to purchase several thousand tons of heavy melting steel

EXTRA WIDE



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at $12.50 last week and a small distress sale at $12 was made recently. However, above $12.75 has been paid and one mill here purchased a small tonnage of rails at above $13.

Cleveland—Prices are showing firmness and several have been marked up 50 cents per ton on actual sales. Forward buying is discouraged by dealers who expect a further advance. A Valley steelmaker has paid $12.50 for a tonnage of No. 1 heavy melting steel, an advance of 25 cents.

Chicago—Scrap prices continue to strengthen as sellers take a long position. In covering orders dealers and brokers have bid up to $10 for heavy melting steel, and even more has been offered for railroad scrap. Pending new buying a nominal market of $9 to $10 is quoted.

Boston—Reflecting firmness in other districts, scrap prices are stronger in New England. The Worcester, Mass., steelworks has been paying $7, delivered, for No. 1 melting steel, with little tonnage coming out at that figure. For tonnage shipments the Worcester consumer would probably pay more, although the price is admittedly flexible.

Dealers have advanced buying prices for No. 1 heavy melting steel 50 cents paying $5.50 to $6, shipping point. Scrap rails, shafting, skeleton and wrought pipe are also stronger.

New York—Scrap prices are strong with advances on some grades, including heavy melting steel up 50 cents a ton. While buying of heavy melting steel is against export orders, there is a slightly better movement to domestic melters.

Philadelphia—In a strong, active market steel and iron scrap has advanced sharply. On a purchase of 5000 tons of heavy melting steel for Coatesville, Pa., $11, delivered, was paid. Demand has boosted No. 2 steel to $8.50 to $9 and heavy breakable cast to $11, delivered.

Buffalo—Tonnage sales of blast furnace scrap have been made with prices now quoted up to $7.50, delivered at consuming points here and nearby. The market is firm and some prices have been advanced in nominal lists.

Cincinnati — Higher prices on iron and steel scrap appear imminent in this district, as soon as buying starts. Yard material is being held more tightly.

Detroit—On the strength of scattering sales, but chiefly due to anticipation of a higher market, covering of a few short orders and some dealer speculations, iron and steel scrap prices here have moved up sharply. No. 1 heavy melting steel and hydraulic compressed sheets now are $8 to $8.50, up $1. Indications of a still stronger market are evident.

St. Louis—Purchasing of iron and steel scrap has subsided, following recent activity. The market is strong, due to scarcity. Offerings are light.

Birmingham, Ala.—Shipments of scrap are slower but resumption is expected with the new year. Melters have small reserves.

Toronto, Ont.—Trading in iron and steel scrap is light. Foundries are picking up small tonnages, with cast the most active. Dealers have large supplies and are not buying.

Tin Plate

Tin Plate Prices, Page 30

Pittsburgh—Hot mill rolling schedules of the tin plate producers in this district declined 10 points to 80 per cent last week. There is practically no interest in first quarter contracts. More export business is noted in the market. Tin plate is $5.25 per base box for the first quarter, with stock plate 4.55c, Pittsburgh.

Semifinished Steel

Semifinished Prices, Page 31

Wire rod shipments $35, Pittsburgh, contracts are continuing heavy. Billets also are active, but demand for sheet bar is slower. The Pittsburgh base of $26 on sheet bars, billets and slabs is firm.

Ferroalloys

Ferroalloy Prices, Page 32

Contracting of ferromanganese for first quarter has begun at the recently announced advance of $3, to $85, duty paid, eastern seaboard, this price applying to spot as well as contracts. Domestic spiegeleisen, 19 to 21 per cent, now is being offered for spot shipment at $26, furnace, a reduction of $1. This reduction also will affect contracts, which may be made for the entire first half of 1934, as compared with first quarter for ferromanganese and most other ferroalloys.

Ferrovanadium has been advanced 10 cents a pound on all grades for the first half. Ferrochromium is up 1-cent a pound, now being quoted 10.00c for 4 to 6 per cent carbon, and up to 66 to 70 per cent chromium, delivered in carlots. Electric ferrosilicon has been advanced $3 a gross ton for 50 per cent, and $6 for 75 per cent, with higher quotations on other grades.

Grecian lump chrome ore, as well as Cuban lump ore, will be advanced $2.50 per ton to $17.50, effective Jan. 1. Ground chrome ores will be advanced $2.50 to $20 Jan. 1.

Cold Finished

Cold Finished Prices, Page 31

Advanced prices on cold-finished steel bars have been filed with the American Iron and Steel institute, raising prices $3 at all basing points except Buffalo, the increase there being $4 to bring prices into line. These new prices are effective Jan. 1. Turned and ground shafting will be advanced $3 per ton, Pittsburgh base, Jan. 1.

Producers of cold-finished bars have been using care in accepting orders for spot shipment, taking only those for which they could be sure of Dec. 31 delivery.

Bolts and Nuts

Bolt, Nut, Rivet Prices, Page 31

Bolts, nuts and rivets are quiet and unchanged. Contracts covering first quarter are slow in closing.

Discounts on hexagon cap screws and square head cap screws have been advanced. Milled hexagon cap screws are now 80-10-10 off; 1-inch and smaller upset hexagon cap screws are 85 off list. Square head set screws, upset sizes 1-inch and smaller, are now 75 and 10 off, with headless set screws 75 off list, effective Jan. 1.

Prices for first quarter are otherwise unchanged at 70 off list for bolts and nuts, 2.75c, Pittsburgh and 2.85c, Chicago, for large rivets.

At Cleveland, the January outlook is improving, chiefly from the automotive industry. December volume in general is below that of November, though recently shipments to automobile builders have increased.

Pittsburgh makers find current contracting light. At Chicago prospects are considered good for buying in first quarter.

Refractories

Refractories Prices, Page 32

Pittsburgh—Prices on fire clay, silica, chrome and magnesite bricks, have been reaffirmed first quarter. The market is active in shipments but new orders are down. Producers are shipping on contracts initiated three to six months ago, on which fourth-quarter balances must be completely shipped by Dec. 31.

Warehouse

Warehouse Prices, Page 34

Warehouse sales at Chicago for December are better than in many years. Orders are well diversified.

Warehouse business at Detroit continues at the level of October and November, equal to the highest of the year. Some letdown, of course, over the holidays is probable. Prices are unchanged.

Demand for warehouse steel is fairly steady at Pittsburgh and while comparable with November, is probably 50 to 75 per cent ahead of last December.

At Cleveland leading interests report December volume slightly ahead of the comparable period of November but tapering in the past few days.

Buying from warehouse in eastern Pennsylvania so far this month has not undergone the sharp decline generally expected.

Tonnage from Cincinnati warehouses is lighter as the result of holiday influence and desire to hold inventories low.

Warehouses at New York have advanced cold-finished steel prices 13 cents per hundred pounds to 3.92c a pound for rounds and hexagons, and 4.42c, flats and squares. Volume with jobbers held up well in December.

Iron Ore

Iron Ore Prices, Page 32

Cleveland—Stocks of iron ore at lower lake ports and furnaces Dec. 1 were 4,115,987 tons larger than on Dec. 1, 1932, but the ore is being consumed much faster, as this report from the Lake Superior Iron Co. association shows:

	Tons
Consumed in October	1,897,589
Consumed in November	1,460,037
Decrease in November	437,552
Consumed in November, 1932	696,331
On hand at furnaces, Dec. 1, 1933	30,794,019
On Lake Erie docks, Dec. 1, 1933	5,405,691
Total at furnaces and Lake Erie docks, Dec. 1, 1933	36,199,710
Total, Dec. 1, 1932	32,083,723

Coke

Coke Prices, Page 31

Two large inquiries for furnace coke are before producers at Pittsburgh. Pittsburgh Steel Co. is asking bids on first half needs for its blast furnace stacks at Monessen, Pa., and New Jersey Zinc Co. for first half coke for its blast furnace at Palmerton, Pa., which produces spiegeleisen. Metallurgical coke demand is better. Furnace coke is quoted at $3.75, Connellsville ovens, for furnace and $4.25 for foundry. Premium brands are held at $5.25.

Cincinnati coke sales of by-product foundry coke are somewhat larger than recent weeks.

By-product foundry coke shipments at Chicago show some gain from enlarged foundry melt. No price has been announced for January.

Metals

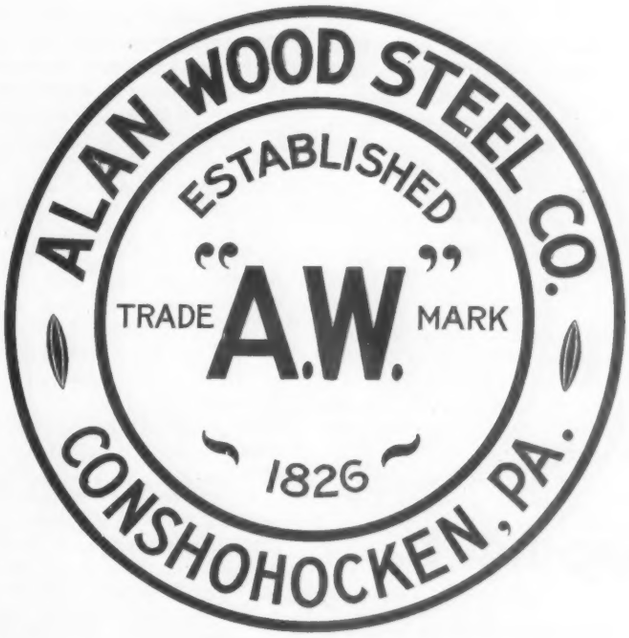
Nonferrous Metal Prices, Page 32, 33

New York—Nonferrous metals reflected the usual year-end quietness

Carbon and Alloy Steels
Blue Annealed Sheets,
Sheared Plates: also Billets.

Rolled Steel Floor Plates
Diamond, Diamondette and Ribbed Patterns

Swede Pig Iron
Rainey-Wood Coke



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with demand for most classifications generally slower.

Copper—Business was done at as high as 8.50c for first quarter delivery but later the market slipped back to 8.25c as consumer buying failed to gain momentum. Brass product prices were further revised.

Zinc—Shading developed in the market and most sellers were quoting 4.45c, East St. Louis, as the week closed. Little business was done.

Lead—Consumers are poorly covered on requirements ahead and active buying is looked for after the turn of the year. Prices were steady.

Tin—Straits metal again slipped below 53.00c but recovered somewhat late in the week.

Silver—Prices shot up sharply Friday following the government's decision to partly remonetize the metal. The open market price Friday was 44.25c.

Aluminum—Remelt was strong and is slightly in better demand. Virgin was quiet.

Coke By-Products

Coke By-Product Prices, Page 34

New York—Output of distillates is being absorbed by current demand with little accumulation of material. Regular consumers are covered at unchanged prices for next quarter. Sellers of sulphate of ammonia are shipping at $25 a ton, eastern seaboard, through December only.

Quicksilver

New York—Quicksilver prices are easy and somewhat mixed in a generally quiet market here. Small lots are quotably $66 to $67, a virgin flask of 76 pounds, and round lots about 50 cents less.

Equipment

Activity in a number of lines of machine tools and plant equipment is slower, although considerable improvement is confidently expected after the first of the year. Long-deferred purchases of equipment cannot be postponed much longer, if plants are to maintain operations, it is felt.

At Chicago, a heavy volume of business is pending, including the bulk of the list recently issued by the Milwaukee road.

Steel mill equipment builders in Pittsburgh are actively figuring some important work for export to Russia, despite the fact that financial details still await clarification. Pittsburgh Steel Co. is completing installation of a Diescher-type tube mill at its Allenport, Pa., works, and last week completed repairs at its rod mill at Monessen, Pa., where an explosion ten days ago had seriously hindered production.

Grinding machinery builders in the Worcester, Mass., district are busier, one plant working extra shifts. Considerable Russian business has been placed with New England shops, most of this being special or standard tools easily and quickly adjustable for various types of work.

Inquiry and buying in the New York district has slackened, volume with most sellers being below last month. Japanese interests are buying miscellaneous tools for an airplane plant.

Pacific Coast

Pacific Coast Prices, Page 31, 33, 34

San Francisco—(*By Air Mail*)—Structural steel and reinforcing bars were the most active the past week, though contracts were not heavy.

Truscon Steel Co. secured 400 tons of reinforcing bars for the Standard Brands of California building in Oakland, Calif. Soule Steel Co. booked 177 tons for highway work in Santa Clara county, Calif. Pacific Coast Steel Corp. secured 125 tons for Boulder dam and 100 tons for headquarters building at Hamilton Field, California. Bids have been opened on 1000 tons for a causeway at Mare Island, Calif. New inquiries include 270 tons for a bridge in Ventura county, California, and 100 tons in Los Angeles county for a bridge.

Pittsburgh-Des Moines Steel Co. is low on two 1,000,000-gallon tanks for Santa Cruz, Calif. Bids have been opened on 250 tons of plates for tanks at Pearl Harbor, T. H.

Metropolitan water district, Los Angeles, has placed two lots of shapes, aggregating 135 tons, with two unnamed interests. Franklin B. Gridley, Pasadena, Calif., was awarded the general contract for 179 tons for a bridge over Santa Ana river in Orange county, California. Bids have been opened on 2500 tons for a causeway at Mare Island, Calif., and on 400 tons for a pier shed at Fort Mason, California. Barrett & Hilp secured the general contract for 1200 tons for the Standard Brands of California building in Oakland. Bids will be opened Jan. 17 for 750 tons for a seaplane hangar at Coco Solo, Canal Zone, and Dec. 26 for 400 tons for hangars at Albrook Field, C. Z.

United States Pipe & Foundry Co. was low on 740 tons of cast iron pipe for Santa Cruz, Calif. Huntington Park, Calif., opened bids Dec. 18 for 432 tons of 6 to 12-inch pipe.

Seattle Gets Best Tonnage

Seattle—The largest reinforcing contract this year to Seattle suppliers was announced this week. This was for the pier at Pearl Harbor, T. H., 5000 tons, to be rolled by the Pacific Coast Steel Corp., Seattle. The job is said to require eventually 7000 tons of reinforcing and 1000 tons of cast steel, shapes and other items. Hawaiian Dredging Co., Honolulu, T. H., has the general contract. The only other award was 150 tons of structurals taken by Isaacson Iron Works, Seattle, for a grain warehouse at Fort Lewis, Wash.

Jobbers report limited turnover. Prices are firm and generally maintained. Considerable tonnage is pending.

Japanese interest in scrap is lagging but much tonnage has been sold and is moving. Prices are firm and steamship space is stronger and scarce. Steel rails are in best demand, although No. 1 foundry scrap also is easily moved. Exporters look for improved prices over $10, c.i.f., now offered by the Orient for good melting steel.

Steel in Europe

Foreign Steel Prices, Page 34

London—(*By Radio*)—Businss in steel and iron is somewhat less active, due to seasonal influences but works are generally well occupied and prospects for the new year are quite favorable. Pig iron stocks and reserves are growing scarce and two more furnaces are being blown in. Others will be put in service when repairs on coke ovens have been completed. Pig iron prices are expected to be higher at the opening of the new year.

A Birmingham firm has booked a contract for 60 railroad trucks for a Persian railroad. United Steel Companies Ltd. has started additional open-hearth capacity. The outlook is generally good except for competition of American tin plate.

The Continent reports seasonal slackening in trade. Berlin finds export demand for structural steel is fair. French trade is sluggish.

Designing Welded Structures for High Efficiency of Joints

(*Continued from Page 23*)

etched with nital and the photographs made at approximately 100 diameters.

The first pair of photomicrographs, at the extreme left, represents the as-rolled condition of 2-inch plates. All the other photomicrographs were taken on the very edge of the weld metal and illustrate the effects which occur in the parent metal. In the as-welded condition, it is seen that the parent metal in the case of 0.40 carbon steel is in a martensitic condition, while the 0.24 carbon steel shows evidence of the original austenite with troostite forming at the grain boundaries. It is to be noted also that the grain has been enlarged considerably.

The probable characteristics of these two zones are extreme brittleness, no ductility, and a general weakened condition due to the large grains. With such characteristics, these zones cannot absorb any energy, as they would be called upon to do in the case of an impact, and furthermore, they have no self-relieving properties under thermal stresses because of their lack of ductility.

Breaks Down Hard Constituents

The effects of the usual stress-relieving treatment at 1200 degrees Fahr., followed by a furnace cool, are illustrated in the center pair of two photomicrographs. Treatment at 1200 degrees Fahr. usually is considered sufficient for stress-relief, since at this temperature, ordinary low carbon steels have a yield of only about 2000 pounds per square inch. This means, of course, that any residual stress greater than 2000 pounds per square inch will produce plastic deformation, and therefore will vanish for all practical purposes. The preloading which was introduced by the contracting weld metal has been removed. The temperature of 1200 degrees Fahr., however, if held for a proper length of time, will serve to break down the harder micro-constituents which are formed in the damaged zones. It will not refine the grain, however, since the carbon does not go back into solution at this temperature.

It is also to be noted in the center pair of photomicrographs delineating the 1200-degree Fahr. treatment that the martensitic and troostitic phases in the two steels have been broken down to what is probably a finely divided sorbite and it is reasonable to suppose that the residual stresses after this treatment are under 2000 pounds per square inch. Experience indicates that welded structures which have received this treatment will retain their shape during machining and indefinitely thereafter.

Treatment at 1350 degrees Fahr. partially refines the grain, while the treatment at 1650 degrees, followed by cooling in still air, represents the maximum degree of refinement that can be obtained. This ideal, in which the pearlite and ferrite are in the finest possible condition, is hardly practical since most welded structures could not be removed from the furnace at this temperature without incurring a severe distortion. In fact, furnace cooling from 1650 degrees is rarely practical since lightweight, high-duty structures may suffer severe distortion in the furnace due to their own weight.

The practical compromise which represents the best commercial practice, therefore, is a soaking treatment for 1 hour per inch of maximum thickness at 1200 degrees Fahr., followed by a slow furnace cooling. Under more rigorous service conditions a gain can be effected practically by raising the temperature to 1400 degrees, at which temperature the grain undergoes partial refinement.

The importance of keeping the carbon content of the steel in the lower ranges is represented graphically in the series of photomicrographs. The local damage done to the higher carbon materials more than offsets the higher average properties which they represent. The magnitude of the brittle phases which are present is a function which increases rapidly as the air-hardening ability of the steel is increased. In the case of the carbon steels, this is, of course, a function of the carbon content. It is through specifications of carbon content that the welding of large structures, such as bridges and ships, which cannot be annealed in a furnace, will become practical.

Peening a Possibility

However, even where metallurgical damage has been minimized in this manner, the problem of stress relief is not solved. As more is known of the nature of residual stresses, mechanical peening will offer a compromise solution which will enable the full possibilities of welded construction to be realized by the designer. The carefully executed ideal,

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in which contours have received proper attention and which has been properly heat treated, need have a lower factor of safety than any other type of construction; it is more predictable. High degree of predictability goes hand in hand with low factor of safety. As the service duties increase and more and more is demanded of the available structural materials, the factor of safety must be reduced.

Modern transportation trends are imposing high duties on available structural materials. Careful design and selection of materials are the only paths to uniform-stress, one-piece structures. In such structures, the joint as an entity must vanish. The behavior of a properly-made welded joint under any kind of load or load cycle cannot be distinguished from the characteristics of a single piece of rolled steel.

Plastic Forming Of Metals

(*Continued from Page 24*)

duction of thickness of 50 per cent. If v designates the magnitude of forward slip at the point of delivery, then:

$$a = \frac{l_1}{r} \times \frac{1}{1+v}.$$

Further, from equation (33),

$$D = l_d \times b_m \times K_f$$

If these relations are substituted in the first equation of this paragraph, the result obtained is:

$$l_m \times b_m \times h_m \times \frac{h}{h_m} \times K_f = 2\, l_d \times b_m \times$$

$$K_f \times a \times \frac{l_1}{r} \times \frac{1}{1+v};$$

and the distance, a, from the roll center line to the point of application of the resultant force is found to be:

$$a = \frac{l_m}{l_1} \times \frac{r \times \triangle h}{2\, l_d}(1+v) = \frac{l_d}{2} \times \frac{l_m}{l_1}$$

$$(1+v) \quad \text{.....(40a).}$$

With small reductions, a, therefore, is equal approximately to $l_d/2$. With greater reductions, however, this distance becomes smaller and the point of application of the resultant force approaches the roll center line. In view of the fact that the forward slip seldom exceeds 5 per cent, as shown in Part II, section 3, this factor can be neglected for practical purposes, so that:

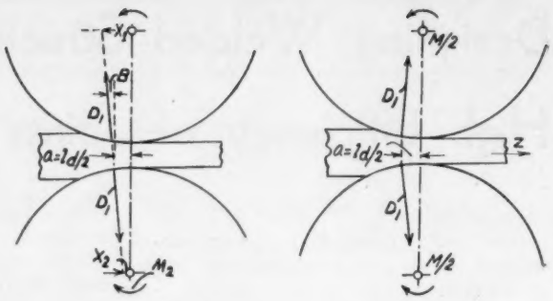
$$a \doteq \frac{l_d}{2} \times \frac{l_m}{l_1} \text{.....(40b).}$$

The result of this calculation is confirmed by the reasoning in Part II, section 3, pertaining to the distribution of pressure in the contact region. Fig. 52 reveals that the center of gravity of the pressure diagram, corresponding to the point of application of the resultant force, is displaced further from the midpoint of the contact length toward the point of delivery, the greater is the elongation of the material. In addition, the flow hardening of the material during the process of rolling, which has not been considered in all this discussion, likewise must cause a displacement of the point of application of the resultant force toward the point of delivery. This is true also regarding the influence of the deformation to which the rolls are subjected, particularly during cold rolling. The actual distance to the point of application of the resultant force during cold rolling, therefore, probably can be computed more accurately by equation (40b) than by equation (40a).

If the rolls have unequal diameters, or if one roll runs as an undriven idler or friction roll; the two rolls no longer exert equal peripheral forces upon the bar, and the resultant force of the bar upon the rolls can no longer act in a direction normal to the axis of the bar. In the case of the idler, for instance, assuming frictionless bearings, the line of the force must pass through the center of the roll. As long as no external forces are applied to the bar in the longitudinal direction, however, the equilibrium conditions require that the resultant forces against the two rolls

Fig. 62 — Equilibrium of forces during rolling when rolls exert unequal peripheral forces on the bar

Fig. 63—Equilibrium of forces during rolling with longitudinal tension



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be equal in magnitude and oppositely directed. Because the assumption can be retained that the resultant force acts through the center of gravity of the contact area, or at a distance

$$a = \frac{l_d}{2} \times \frac{l_m}{l_1}$$

from the point of delivery, a distribution of forces like that shown in Fig. 62 is obtained for this case. The force, D, transmitted to the screws corresponds to the vertical component, $D' \times \cos \beta$, of the resultant force, D', which is exerted by the bar against the rolls. The torque on the upper roll is now:

$$M_1 = D' \times x_1 \times \cos \beta = D \times x_1,$$

and that on the lower roll is:

$$M_2 = D \times x_2.$$

Inasmuch as $x_1 + x_2$ can be set equal to 2a, in consideration of the small difference of roll diameters, the torque corresponding to the pure rolling work is obtained as:

$$M = M_1 + M_2 = D(x_1 + x_2) = 2\,D \times a,$$

which is the same quantity as that of equation (38). The relations derived at the beginning between the measurable separating force, D, the useful power and the pure rolling work, are unaffected by the transmission of unequal forces by the two rolls.

The relations are similar when a longitudinal force, Z, is applied to the bar outside the rolls (see Fig. 63). As long as the longitudinal stresses produced by this force remain small, in relation to the deformation resistance of the material, the magnitude of the resultant force exerted on the roll cannot be appreciably influenced. Its direction changes, however, because the equilibrium conditions could no longer be fulfilled with a perpendicularly directed resultant force. The torque provided by the drive thereby assumes the magnitude, $M = 2\,D \times a - Z \times r$, if the tensile force acts beyond the rolls; or, $M = 2\,D \times a + Z \times r \times \frac{h_1}{h_0}$, if the tensile force acts ahead of the rolls, because the longitudinal force applied to the periphery of the roll performs a corresponding part of the rolling work. Rolling power and rolling work nevertheless are given again, with close approximation, as:

$$L_w = 2\,D \times a \times \omega$$

$$A_w = 2\,D \times a \times \alpha$$

(see equations (39a) and (39b). The useful power and the pure rolling work, therefore, still can be calculated in the described manner from the measured separating force, even when external longitudinal forces assist in their transmission.

However, calculation based on the separating force alone is no longer permissible when longitudinal forces are applied on both sides, so that the longitudinal stresses produced in the bar are no longer small in comparison to the deformation resistance of the material. An appreciable part of the work of deformation then is performed directly by the longitudinal tension, as a result of which the separating force is decreased correspondingly.

(To be Continued)

Men of Industry

(Concluded from Page 17)

Wheeling Steel Corp., Wheeling, W. Va. He succeeds J. E. Daily who resigned recently to become manager of the Chicago district plant, Youngstown Sheet & Tube Co., Youngstown, O., as noted in STEEL for Nov. 27.

□ □ □

William R. Case, for 30 years associated with heavy hardware and steel jobbers in Seattle, has been named sales manager of the Seattle Steel Co.

□ □ □

Robert Kerr, prominent executive in the Canadian machinery industry, has been appointed president of the A. R. Williams Machinery Co. Ltd., Toronto, Ont.

□ □ □

A. H. Lillengren has been appointed acting purchasing agent, effective Jan. 1, for the Great Northern railroad, St. Paul, succeeding F. I. Plechner, who has been granted a leave of absence.

□ □ □

L. W. Briggs has been appointed general manager of sales for West Leechburg Steel Co., Pittsburgh. Prior to this appointment, Mr. Briggs has been Chicago district sales manager for the West Leechburg Steel Co. since 1924.

□ □ □

Ambrose Swasey, chairman of the board, Warner & Swasey Co., Cleveland, was honored by a birthday dinner, at the University club, Cleveland, Dec. 18, given by Philip E. Bliss, president of the company. Recently Mr. Swasey was awarded the 1933 medal of the American Society of Mechanical Engineers (STEEL, Dec. 11, p. 26) for his part in the advancement of the turret lathe and astronomical telescope.

□ □ □

William M. Horton has been appointed factory manager of the Ferry Cap & Screw Co., Cleveland. At one time he was associated with the Kirk-Latty Mfg. Co., and later became assistant director of operations of the Lamson & Sessions Co., Cleveland, with which the Kirk-Latty company was consolidated. He holds numerous machinery patents and is responsible for manufacturing improvements in the screw and bolt industry.

□ □ □

E. J. Billings, Babcock & Wilcox Co., New York, has been elected president of the Exhibitors Committee Industrial and Power Shows Inc., New York. Other officers elected to serve in 1934 are: Vice president, L. W. Shugg, General Electric Co., Schenectady, N. Y.; secretary, F. C. Kerns, the Texas Co., New York; treasurer, J. P. Ferguson, Reading-Pratt & Cady Co. Inc., Bridgeport, Conn.; and executive secretary, W. A. Hemming, New York.

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Construction and Enterprise

New York

NEW YORK—Register & Grille Mfg. Co. Inc. has been incorporated to manufacture metal products and hardware, by Edw. M. DeCastro, 40 Wall street, New York.

ROCHESTER, N. Y.—City is seeking a federal loan of $500,000 for construction of a bridge in Elmwood avenue.

New Jersey

NEWARK, N. J.—Newark Special Tool & Machinery Co. Inc., has been incorporated with $100,000 capital to deal in machinery, by Ernest M. Smith, 108 Alexander avenue, Newark, N. J.

Pennsylvania

FLEETWOOD, PA.—City has approved a bond issue of $115,000 for construction of a municipal electric light and power plant.

MANOR, PA.—Fry & Mathias Distillery, W. Fry in charge, is having plans made by K. B. Weber, 3860 Baytree avenue N. S., Pittsburgh, for remodeling a 3-story warehouse 30 x 90 feet into a distillery, with complete new equipment and power plant.

PITTSBURGH—Iron City Sand & Gravel Co. has asked federal permission to build two ice breakers on the left bank of the Monongahela river above Pittsburgh.

TITUSVILLE, PA. — Pennsylvania Refining Co. will take bids soon on additions and alterations to its refinery, including a complete distillate unit, to be undertaken in 1934, at cost of about $50,000.

Ohio

AKRON, O.—Newton Brass Foundry & Pattern Works Inc. has been incorporated with 250 shares no par value, by D. L. Van Buskirk, Clarence E. Kroeger and associates, 402 Ohio building, Akron, O.

CAMBRIDGE, O.—Ohio Roto-Cam Sales Co. has been formed and has bought the machinery, equipment and patents of the Panyard Automobile Oil Ring Co., Detroit, and production of the rings will be removed to Cambridge. Equipment is being installed in the plant of the Cambridge Machine & Supply Co., C. R. Harris, secretary. John Panyard, inventor of the ring, will be in charge of production.

CLEVELAND—J. W. Little, architect, Plymouth building, is drawing plans for a distillery to cost about $200,000. W. J. Leipner, Plymouth building, is taking bids for equipment.

COLUMBUS, O.—Hoster Brewing Co., 3240 A. I. U. building, H. C. Tuller, secretary, plans a 1-story boiler plant in its new brewery, with electric power equipment. Total cost will be about $300,000. Albert Kohn Inc., City Center building, Detroit, is architect and engineer.

COLUMBUS, O.—City has approved a fund of $824,000 for construction of a municipal electric light and power plant extension.

IRONTON, O.—Ironton By-Product Coke Co., 61 Broadway, New York, plans a dock with coal-handling and conveying equipment, on the Ohio river, to cost about $30,000.

SANDUSKY, O.—City has voted $1,400,000 to cover cost of a municipal electric light and power plant.

SANDUSKY, O.—W. H. Millspaugh, Toledo, O., formerly head of the Paper & Textile Machinery Co., has bought 14 acres in the west end of the city on which he will erect a steel mill to utilize processes patented by Mr. Millspaugh.

SOMERSET, O.—Village council plans a waterworks pumping station, 100,000-gallon elevated tank and other improvements, to cost about $58,000. Jennings-Lawrence Co., 12 North Third street, Columbus, O., are engineers.

Michigan

DETROIT—Michigan Chandelier Co. has been incorporated with $100,000 capital to manufacture lighting fixtures, by the Milfreda Corp., 3130 Chane street, Detroit.

DETROIT—Superior Tool Works Inc. has been incorporated with $20,000 preferred stock and $35,000 common, to manufacture tools, fixtures and machinery, by Clifford W. Trombly, 6633 Rohns avenue, Detroit.

DETROIT—American Electrical Heater Co., 6125 Woodward avenue, has let a general contract to Albert A. Albrecht Co., 1201 Penobscot building, Detroit, for a 3-story electrical heating unit factory on Burroughs avenue, to cost about $50,000.

NILES, MICH.—Four Flags Brewing Co., Niles, Mich., has retained Newhouse & Bernham, Chicago, architects, to prepare plans for an addition and alterations to its brewery at estimated cost of $75,000.

Indiana

LAFAYETTE, IND.—Midwest Dairy Engineers Inc., 205 Columbus street, has been incorporated to manufacture dairy machinery, with $15,000 capital, by W. S. Crumb and H. L. Kisker.

Illinois

CHICAGO—Gee Bee Mfg. Co., 900 West Van Buren street, has been incorporated with 20 shares capital stock to manufacture vending and pin machines and metal novelties, by Berkley Dougls, correspondent, 124 North LaSalle street, Chicago.

CHICAGO—American Model Engineers Inc., 2154 Lawrence avenue, has been incorporated with 100 shares no par value to manufacture models, instruments and equipment, by Poppenhuysen, Johnston, Thompson & Cole, correspondents, 11 South LaSalle street, Chicago.

ELGIN, ILL.—Elgin Machine Works Inc., 412 North State street, will build a 2-story addition, is estimated to cost $24,000, with equipment.

LOCKPORT, ILL.—Board of directors, sanitary district of Chicago, 910 South Michigan avenue, Chicago, is considering plans for extensions and improvements to the power plant at Lockport, to cost about $800,000.

Wisconsin

GREEN BAY, WIS.—H. A. Bond, 920 South Madison street, has incorporated Hall's Distillery Inc. and engaged R. B. Williamson, architect, 709 North Broadway, Milwaukee, to make plans for rebuilding a large local brewing plant into a distillery and bottling plant, with new equipment throughout.

MILWAUKEE—Burges Ice Machine Co., Chicago, has been awarded at $15,965 a contract for the refrigerating equipment for the new $75,000 cold storage warehouse at the national soldiers' home here.

STOUGHTON, WIS.—City council has voted to apply for a federal loan of $121,000 for adding a standby unit to the municipal electric light plant E. U. Norman is city clerk.

TWO RIVERS, WIS.—State public service commission has approved construction of a proposed municipal electric power and light plant to cost $250,000. E. J. Donnelly is city manager.

Southern States

WASHINGTON—Bureau of supplies and accounts, navy department, will receive bids until Dec. 27 for one electric heat-treating furnace and one steam locomotive crane, both for delivery at Newport, R. I., schedules 1422 and 1423.

Pacific Coast

COUER D'ALENE, IDAHO — Voters have approved a bond issue of $600,000 for construction of a municipal electric light and water system.

SEATTLE—Hagbo Tool Co. has been incorporated with $50,000 capital, by Lars E. Hagbo and W. A. Wilson, 416 Twentieth avenue north.

HUNTINGTON PARK, CALIF.—Adams Mfg. & Engineering Co., Ernest H. Adams, president, has had plans prepared for a plant on East Slauson avenue, to cost about $150,000. It will be used for reclaiming used pipe and for the manufacture of pipeline equipment, fence posts, surveyor's stakes and ornamental fixtures.

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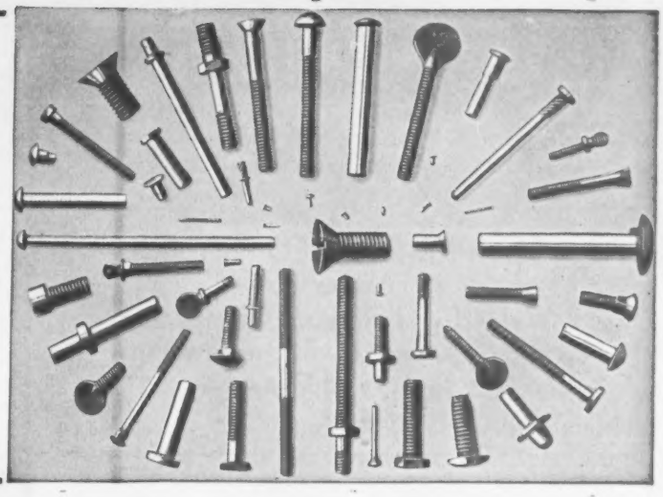

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